TEXTILES PAPER LEATHER

AMERICAN DYESTUFF REPORTER

Including the Proceedings of the
AMERICAN ASSOCIATION OF TEXTILE CHEMISTS AND COLORISTS

VOLUME XV MAY 31, 1926 NUMBER 9

GEIGY

PAINLESS EXPERIMENT:

Novelty effects in hosiery and knit goods are still the leading sellers in these fields. In their production Celanese Brand Yarn, Cotton, Wool, Silk and Rayon in various combinations have been the factors.

A Difficulty

Unfortunately for the manufacturers, the job of getting suitable effects is not completed with the construction of the garment, particularly where Celanese and Wool or Real Silk are used, since, under ordinary conditions, Wool or Real Silk Colors require a boil to be effective, and few of these possess the quality of leaving unstained the Celanese and Cotton or Rayon effects.

Temperatures above 180° F. are destructive of the lustre of the Celanese. Furthermore, Celanese must be kept clean for the Setacyl Direct Colors (powd.), otherwise all structural work is for naught.

Experiment to obtain the proper dyestuffs is painful and far from remunerative.

The Solution

For your ease of mind, a small but complete and fool-proof range of Gyco Neutral Colors CW (*C*elanese *W*hite) for dyeing Wool or Silk *in one bath* with a combination of the above mentioned fibres, has been selected after months and months of concentration, which leaves you free to develop the structure of your garment. Samples of these colors are yours for the asking.

An Offer

Geigy makes it still easier for you by volunteering dyeing experience, time and art in making the most of the effects created by you, thus enabling your designers to see the patterns in colors of the greatest efficiency and the *selling possibilities* of the garment.

What to Do

Simply send in your material, suggest any desires in your mind, and leave experimenting to Geigy. *It pays.*

Celanese Brand Yarn
requires
Setacyl Direct Colors
(Powder)

In U. S. and Canada:
Sole Selling Agents for
J. R. GEIGY S. A.
Basle, Switzerland

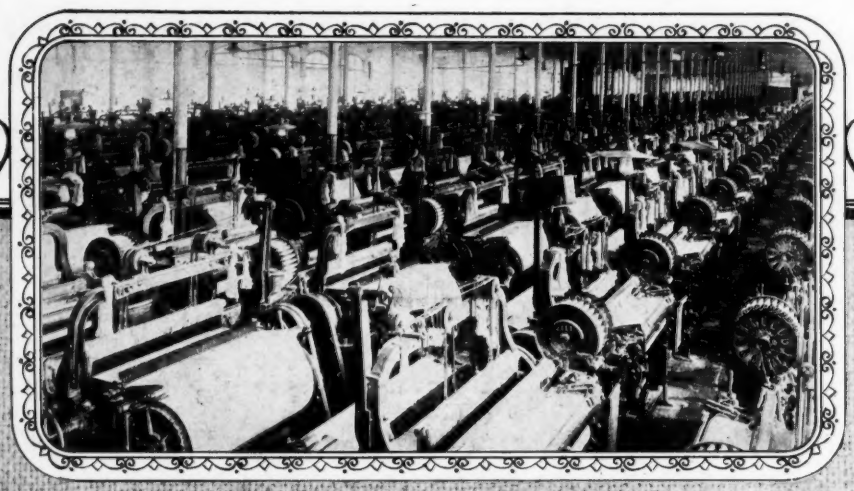
BRANCHES:
Boston, Providence, Cincinnati, Philadelphia, Toronto, Portland, Oreg., Columbus, Ga.

GEIGY COMPANY Inc.
89-91 BARCLAY STREET
NEW YORK, N. Y.

In Great Britain:
THE GEIGY COLOUR CO., LTD.
35-37 Dickinson Street
Manchester

Branch Works at Clayton

Established 1764—J. R. GEIGY S. A.—Manufacturers of dyestuffs since 1859



Use "AKCO" Warp Size

—To Obtain—

Smooth, Uniform Warps
Even Penetration
Greater Loom Efficiency

—To Reduce—

Production Costs
Shedding or Flaking
Percentage of Seconds

We recommend the use of "Akco" Warp Size for the best results in all warp sizing operations. A demonstration will convince you.

A. KLIPSTEIN & CO.

644-52 Greenwich St.
NEW YORK CITY

Branches:
Boston Philadelphia Chicago Providence, R. I. Charlotte, N. C.

Represented in Canada by
A. KLIPSTEIN & CO., Ltd., 114 St. Peter St., Montreal

AKCO
TRADE MARK

American Dyestuff Reporter, Vol. XV, No. 9. May 31, 1926. Published twenty-two times a year by Howes Publishing Co., Inc. 90 William Street, New York, N. Y. Domestic subscription, $5.00; Canadian, $5.50; foreign, $6.00. Entered as second-class matter, Nov. 6, 1919. at the New York, N. Y., Post Office, under the Act of March 3, 1879. Copyrighted, 1926, by Howes Publishing Co.

Amanil Fast Orange G L Z
Amanil Fast Orange P R Z

The above products are superior in solubility and level dyeing properties to the imported types of Pyrazol Orange.

These products do not fade reddish on exposure to light and are better adapted as a base for fast mode shades than many of the imported fast to light oranges.

Among their many other valuable properties may be mentioned—

Wash fastness
Acid fastness
Unions practically solid
Discharge perfect

American Aniline Products, Inc.

45 EAST 17th STREET, NEW YORK, N. Y.

Offices: Boston, Mass.
Philadelphia, Pa.
Chicago, Ill.
Charlotte, N. C.

Works: Lock Haven, Pa.
Nyack, N. Y.

Röhm & Haas Company, Inc.

We have specialized in the manufacture of

Hydrosulfites

and Allied Products

Lykopon—Anhydrous Sodium Hydrosulfite for reducing indigo and vat dyes, for stripping, etc.

Formopon—Sodium Formaldehyde Sulfoxylate for discharge printing.

Indopon W—Indigo Discharge Assistant.

Formopon Extra—Basic Zinc Formaldehyde Sulfoxylate for stripping dyes.

Protolin—Soluble normal Zinc Formaldehyde Sulfoxylate for stripping dyes.

Protolin AZ—A special soluble Sulfoxylate for stripping dyes.

Our laboratory makes a special study of these products and their application, and appreciates the opportunity of co-operating with users in solving any problems which the employment of these products presents. Suggestions for stripping dyes from all classes of goods are supplied on request.

We also manufacture in our own plants a wide range of Heavy Chemicals, including Acids, Sodium Sulfide, Glauber's Salt, Aluminum Sulfate, Aluminum Chloride, liquid and crystals, Tartar Emetic, etc.

Office
40 North Front Street
PHILADELPHIA

Factories
Bristol and Bridesburg, Penna.
Branches
Chicago, Ill. Gloversville, N.Y.
Boston, Mass.

UNITED CHEMICAL PRODUCTS CORPORATION

IMPORTERS, EXPORTERS AND MANUFACTURERS

YORK AND COLGATE STS., JERSEY CITY, N. J.

Announcing our new products

CHROME FAST BLACK B
and
DIRECT BRILLIANT VIOLET 2R

We also manufacture and recommend

DIRECT FAST BLACK L
DIRECT FAST BLUE 4 G L
DIRECT FAST BLUE 2 G L
BRILLIANT SULPHUR BLUE L M C Conc.

The best money value blue for chambrays, cheviots, ginghams or denims

OILS, SOFTENERS and TEXTILE SPECIALTIES

CHARLOTTE, N. C. ——BRANCHES—— PAWTUCKET, R. I.

NEW YORK COLOR & CHEMICAL CO.

Manufacturers of ANILINE COLORS

Fast Dyes—

Mordant Colors for Men's Wear, etc., Fast to Extreme Requirements.

Fast Acid Colors for Ladies' Dress Goods, etc., Fast to Light and Level Dyeing.

Light Fast Colors for Cotton, Rayon and Silk, for Dress and Upholstery Material, etc.

Main Office and Works - - - BELLEVILLE, NEW JERSEY

Swat Problems One by One—

HOW many things in a dyehouse can go wrong! The alert superintendent removes the sources of trouble one by one, as he would swat flies. He is then able to give his full attention to production.

Those who turn to *Camel Dyes* soon find that they have eliminated one prolific source of trouble. Their color problems cease to be problems. They know that the cumulative experience of years of manufacturing assures perfect dye products and unmatchable service.

CAMEL DYES

Aceko (Acid)
Ethonic (Level Dyeing Acid)
Amidine (Direct)
Sol-Amidine (Light Fast Direct)
Amalthion (Sulphur)
Kromeko (Chrome)

Samples, technical advice and practical assistance gladly furnished

JOHN CAMPBELL & COMPANY

75 Hudson Street *American Dyestuff Manufacturers* New York, N. Y.

Branches and Warehouses: Boston; Chicago; Providence; Charlotte; Philadelphia

"STANDARDS EVERYWHERE"

The Sales Agent Knows—
Goods finished with Oakite helps him to:
1. Keep OLD customers.
2. Make NEW ones.
3. Create a reputation for quality merchandise.

THE AGENT responsible for the sale of a mill's product appreciates the difference when Oakite has been used in processing. He may not know just why or how it has been accomplished. But he does recognize immediately the QUALITY of the finish, the soft even texture of the goods and the uniform excellence of dyeing.

These noticeable improvements give to the men who sell a decided advantage.

New customers quickly sense the difference in the "feel" of the goods, the life or brilliance of the colors, and the freedom from harshness and unevenness when Oakite has been used. And a reputation for fine quality products is an important asset to any mill.

Ask to have one of our service men call and find out the possibilities of using Oakite in your mill, or write for booklet called "Wet Finishing Textiles," which describes how Oakite materials are used in wet finishing operations. A copy will be gladly mailed you free on request. Send for it today.

Oakite Service Men, cleaning specialists, are located at

Albany, Allentown, Pa., *Atlanta, Ga., Baltimore, *Boston, Bridgeport, *Brooklyn, Buffalo, Camden, Charlotte, N. C., *Chicago, *Cincinnati, *Cleveland, *Columbus, O., *Dallas, *Davenport, *Dayton, *Denver, *Des Moines, *Detroit, Erie, Flint, Mich., *Grand Rapids, Harrisburg, Hartford, *Indianapolis, Jacksonville, Fla., *Kansas City, *Los Angeles, Louisville, Ky., *Milwaukee, *Minneapolis, *Montreal, Newark, Newburgh, N. Y., New Haven, *New York, *Oakland, Cal., Philadelphia, *Pittsburgh, Portland, Me., *Portland, Ore., Providence, Reading, *Rochester, Rockford, Rock Island, *San Francisco, *Seattle, *St. Louis, Springfield, Ill., Syracuse, *Toledo, *Toronto, *Tulsa, Okla., Utica., *Vancouver, B. C., Williamsport, Pa., Worcester.

*Stocks of Oakite Materials are carried in these cities.

OAKITE

TRADE MARK REG. U.S. PAT. OFF.

Industrial Cleaning Materials and Methods

OAKITE IS MANUFACTURED BY OAKLEY CHEMICAL CO.
54a THAMES ST., NEW YORK, N.Y.

SOLVAY ANCHOR BRAND SODA

SOLVAY

STANDARD IN SODA SINCE 1881

SOLVAY products are sold on the basis of *actaul* Alkali content.

SOLVAY 58% Soda Ash *contains* 58% of *actual* sodium oxide.

SOLVAY 76% caustic soda *contains* 76% of *actual* sodium oxide.

Specify SOLVAY—the standard in SODA since 1881.

The Solvay Process Company

Detroit, Mich. Syracuse, N.Y. Hutchinson, Kans.

WING & EVANS, Inc.
40 Rector Street

Sales Department
New York

Boston Cincinnati Cleveland Detroit Pittsburgh
Chicago Syracuse Indianapolis Philadelphia
St. Louis Kansas City

Finish Chiffon Hosiery with

KALIZINE

Kalizine firms up the goods; prevents pulling of threads from handling; stops welt curling; assures smoothness and adds greatly to appearance of finished product.

Hydroxy Art Silk Boil Off Oil—for boiling out Coning and Winding Oils before Dyeing.

"Solivol B"—for Softening Bleached and Dyed Rayon.

Hydroxy Three Fibre Boil Off Oil—Degums Pure Silk and Boils out Coning and Winding Oils same time.

Hydroxy Art Silk Coning and Winding Oils.

Write for a copy of "Popular Textile Chemistry," by James A. Branegan, President Kali Mfg. Co.

The KALI Mfg. Co.
Manufacturing Chemists
1410 N. Front Street, Phila., Pa.

Quality is a constant

THE dyestuffs that result from the union of GDC knowledge, experience and resources appeal particularly to the quality requirements of the industry.

The factors which govern the production of these dyestuffs are themselves fixed—so it is logical that quality is always present to insure your satisfaction.

Experience weighs heavily in the scale. For over half a century we and our immediate predecessors have been furnishing dyestuffs of the highest type.

GDC

We offer the products manufactured by

GRASSELLI DYESTUFF CORPORATION
ESSEX ANILINE WORKS, INC.
BEAVER CHEMICAL CORPORATION
(Alizarine Products)

and the dyestuffs manufactured by

I. G. FARBENINDUSTRIE AKTIEN-GESELLSCHAFT in their several factories
BADISCHE ANILIN & SODA FABRIK, LUDWIGSHAFEN, GERMANY
FARBWERKE vorm. MEISTER LUCIUS & BRÜNING, HOECHST a. M., GERMANY
FARBENFABRIKEN vorm. FRIEDR. BAYER & CO., LEVERKUSEN, GERMANY
LEOPOLD CASSELLA & CO., G. m. b. H., FRANKFURT a. M., GERMANY
AKTIEN-GESELLSCHAFT FÜR ANILIN FABRIKATION, BERLIN, GERMANY
CHEMISCHE FABRIK GRIESHEIM-ELEKTRON, FRANKFURT, a. M., GERMANY
CHEMISCHE FABRIKEN vorm. WEILER-TER MEER, UERDINGEN, GERMANY

GENERAL DYESTUFF CORPORATION

NEW YORK, 230 FIFTH AVENUE

BOSTON, 159 HIGH STREET
PHILADELPHIA, 111 ARCH STREET
PROVIDENCE, R. I., 52 EXCHANGE PLACE
CHICAGO, 305 WEST RANDOLPH STREET
SAN FRANCISCO, 22 NATOMA STREET
CHARLOTTE, N. C., 220 W. 1st STREET

ALIZARINES BEAVER SULPHUR COLORS

SERVICE ECONOMY

Announcement

Brilliant Acid Red B

A new color manufactured by Noil Chemical & Color Co. A very bright Red, dyes level with Sulphuric Acid, leaving Celanese unstained. Is also recommended for Pinks, and has excellent light fastness.

DUNKER & PERKINS CO.
263 SUMMER STREET BOSTON, MASS.

United States Color & Chemical Company, Inc.

93 Broad St. Boston, Mass.

New York Office: 25 Howard St.

FACTORIES:
NEW ENGLAND ANILINE WORKS, Inc.
Ashland, Mass.

GARFIELD ANILINE WORKS, Inc.
Garfield, N. J.

Established 1895

BOSSON & LANE

Manufacturers of
The Original
BLEACHING OIL
for boiling out Cotton, to produce a foundation for a Pure White

High Grade Sulphonated and Saponified
CASTOR OIL PRODUCTS

Para Soap Oil

Solvents and Assistants for cleaning all Textiles

B & L Bleachers' Bluings and Tints

Works and Office, ATLANTIC, MASS.

AMERICAN RAPIDASE COMPANY · NEW YORK · RAPIDASE

A LIQUID PRODUCT — RAPID IN ACTION

FOR ALL DESIZING REQUIREMENTS

Whether you desize before kier boiling, before dyeing in the gray or before the final finishing, as in the case of cotton and mixed rayon shirtings, dress-goods, etc., Rapidase will be found to be most efficient and most economical.

Write for further information.

American Rapidase Company, Inc.
171 Madison Avenue
New York, N. Y.

Advanced Color Effects in Cross-Dyed Hosiery

Within Reach of All Knitters

OUR practice of a Specialized Dye Process for Hosiery Cross-Dyeing is constantly developing new and most startling color effects—all the result of a single and decidedly economical operation.

Knitters can now arrange a quick response to market demand by sending us their gray goods, *of whatever fibre mixture.*
We undertake the

Dyeing • Finishing • Packaging

making direct shipment to the trade if desired.

Among our many attainments in dyehouse practice, is the "Varishade" Process [Umbre Dyeing] of graduated color tints for Ladies' Hosiery, Underwear and Nightgowns.

A trial order will best demonstrate the result of our perfected service

THE NEVERSINK DYEING CO., INC.
Reading Penna.
PENNSYLVANIA DYE & BLEACH WORKS, INC.
Harrisburg Penna.

Onyx Oil & Chemical Co.

Oils, Chemicals, Gums and Finishes
for the
THROWSTER, DYER, FINISHER AND PRINTER

Headquarters for

SANITOSE
Reg. U. S. Pat. Off.
A superior silk finish

SILTEX GUM
Reg. U. S. Pat. Off.
The new printing gum

DECERESENE
Reg. U. S. Pat. Off.
The chemical degummer

Office and Works: Jersey City, N. J.

Our Laboratory at your service.

AMID DURON

Duron Emulsions
are stable and excel any lubricant for spinning of yarns. They increase production and guarantee a perfect carding, combing and spinning.

Art Silk Emulsions C or N Conc.
for winding artificial silk.

Amid Waxes
are far more effective in thread finishing than waxes emulsified by aid of an alkali or soap.

Amid Tallow
combines readily with all starches and far more evenly than Raw Tallow. It is neutral and non-odorous. Its ideal penetrating powers acknowledged.

Amid Fat Liquor
Amid Codolene
Solamid
admirably adapted for tanning, dressing and finishing of all kinds of leather.

Correspondence and Trial Orders Solicited

AMID DURON COMPANY
110 East 42nd Street NEW YORK

How White is a "Hound's Tooth"?

As permanently white as goods processed with Solozone

(A permanent white without weakening, soft, odorless and elastic)

Send for any of these interesting Booklets

"Make your own Liquid Peroxide"

"Efficient and Economical Bleaching"

"The Public want better Bleached Goods—Where can they get them?"

R&H CHEMICALS

We are equipped to process sample lots of any size under mill conditions and instruct the bleacher

The ROESSLER & HASSLACHER CHEMICAL CO.
713 Sixth Avenue
New York

Contents of This Issue

May 31, 1926

New Solvents Made by the Hydrogenation Process 345
Elvin H. Killheffer

The Dyeing of Hatters' Felt..... 351
S. Marion

Proceedings of the American Association of Textile Chemists and Colorists

April Meeting of the Northern New England Section 355

The Finishing of Worsted Cloth—*A Paper* by Ernest A. Johnson..... 356

Discussion of Worsted Finishing..... 357

Thirty-eighth Council Meeting..... 360

Applicants for Membership..... 362

Changes of Address..... 362

Obituary 362

Foreign Dyes Imported Through New York and Other Ports During April..... 363

Editorial:

Inefficiency and Dyeing Costs..... 369

Practical Hints on the Production of Bright Colors on Textile Fabrics—Part XIX.. 372
Raffaele Sansone

The Reduction Products of Azo Dyes Part XIII 374
Walter C. Holmes

Technical Notes from Foreign Sources.... 377

DIAX

Bleachers, Finishers and Dyers have complained that de-sizing compounds were expensive and hard to handle.

DIAX, made by the MALT-DIA-STASE CO., brought down the price and made its use easy.

DIAX, because it is better, is being used with great success by the largest Bleachers, Finishers, Printers and Dyers

Write us for Free Demonstration and Sample

MALT-DIASTASE COMPANY
79 Wall St., New York City

LABORATORIES
58-64 Garden Street, Brooklyn, N. Y.
Wyckoff Avenue and Decatur Street, Evergreen, N. Y.

ALBINOL
the Supreme
TEXTILE SOAP

Aniline Colors Dyestuffs

Chemicals and Chemical Specialties

Softeners and Soluble Oils

EUGENE VELLNER
1209-11-13 North 4th St., Philadelphia, Pa.

National Buffalo Black NB

A New Acid Black, possessing excellent solublility, and practically unaffected by metals.

SPECIALLY recommended for the production of Navy Blues, Dark Greens, and Blue-Blacks on yarn or piece-goods. Of good fastness to light, crocking, carbonizing, and alkali.

Product samples obtainable upon request to any of our branches.

National Aniline & Chemical Co., Inc.
40 Rector Street, New York, N. Y.

BOSTON	PHILADELPHIA	SAN FRANCISCO
PROVIDENCE	CHICAGO	MONTREAL
HARTFORD	CHARLOTTE	TORONTO

NATIONAL DYES

NATIONAL N DYES

AMERICAN DYESTUFF REPORTER

"Circulated Everywhere Dyestuffs Are Used"

Published by Howes Publishing Company, 90 William Street, New York.

Devoted to the practical application of dyestuffs in all industries; especially to textile chemistry—the science and practice of scouring, bleaching, dyeing and finishing.

VOLUME XIV | NEW YORK, MAY 31, 1926 | NUMBER 9

New Solvents Made by the Hydrogenation Process

Principal Products in Present Use—Tetralin—Decalin—Hexalin—Liquid Siccatives—Linoxyn Solutions—Rubber Dissolving Agent—Cellulose and Rubber Combination—Homogeneous Liquid Mixtures—Emulsifying Agents—Hexalin in Soap—In Lacquer—Cyclohexanone—Hexalin Acetate —Methyl Hexalin

By ELVIN H. KILLHEFFER

Vice-President, Newport Chemical Works, Inc.

OVER a period of several years various articles have appeared here and there describing one or another of the comparatively new solvents made by the hydrogenation process. The following is written with the idea of bringing together in one article a description of some of the principal solvents, with some general information as to their present uses.

The information regarding their uses is obviously of a rather sketchy character in a good many instances. Some of the solvents are, in fact, being put to such a diversity of uses that it is impossible at this writing to cover them all; nor, as a matter of fact, is too much known regarding the detail of some of the uses to which they are put. Very often in an article of this kind, where products are described and a few suggestions thrown out, people in various industries can see possibilities for new applications which are not apparent to people outside of the industries concerned, who are, therefore, not familiar with the needs and requirements—or, in fact, the opportunities—in such industries.

In an article of this kind, devoted principally to a description of the products themselves and their application in industry, it is hardly necessary to describe in any great detail the actual process of manufacture; suffice it to say, therefore, that the various solvents herein mentioned and described are made by a process of hydrogenation, which is the addition of hydrogen to the base products, naphthalene, phenol, cresol, acetone, etc., by the aid of a catalyst under certain conditions of temperature and pressure. The process of hydrogenation itself is described in detail in the "Dictionary of Applied Chemistry" (Thorpe), as well as in other works, such as "Synthetic Organic Compounds" (Schotz) or "The Industrial Applications of Coal Tar Products" (Bunbury and Davidson).

The principal products known and used at the present time are as follows:

Tetralin (Tetra-Hydro-Naphthalene)
Decalin (Deca-Hydro-Naphthalene)
Hexalin (Cyclohexanol or Hexa-Hydro-Phenol)
Cyclohexanone (the ketone, whereas Cyclohexanol is the Alcohol)
Hexalin Acetate (Cyclohexanol Acetate)
Methyl Hexalin (Methyl Cyclohexanol)

Tetralin

Tetralin is made by the hydrogenation of naphthalene. It is a water-white liquid with a boiling point of 206 deg. Cent. and a specific gravity of 0.975, flash point 80 deg. Cent., freezing point —25 deg. Cent. It is a stable compound even at its boiling point. Tetralin can be sulphonated. It is a very powerful solvent for organic substances, and it is an excellent solvent for all kinds of fats, oils, waxes, resins and soft gums, but does not dissolve shellac or the phenol-formaldehyde resins.

Tetralin has already found a multiplicity of uses, its principal one at the present time probably being in various detergents and liquid soaps. Its value in such compounds is its high solvent power over a wide range of oils, gums and waxes. Its high boiling point is, of course, very valuable in this connection, as it can be used in various detergents even though they are used at high temperatures, and where Tetralin is employed as the organic solvent there is no danger of its loss by evaporation at these higher temperatures. For many textile soaps and detergents it is brought into a form soluble in water by the addition of Hexalin and a little soluble oil or soap.

The high flash point, as against the commonly used dis-

solving and lacquer thinning agents, quite substantially reduces the danger of fire, with the result that the storage and handling of Tetralin does not come under the same class as benzol.

Tetralin has been used in place of turpentine in various paints applied by spraying. There is a difficulty, however, in this direction, due to the great dissolving powers of Tetralin, and that is that if more than one coat is applied the second coat dissolves away a large proportion of the first. This fact was quickly utilized by the further use of Tetralin in various compounds for removing paint and varnish.

An extensive use is made of it in the manufacture of shoe creams and polishing substances. In this connection the degree of volatility which lies above that of turpentine oil prevents unduly rapid drying of the cream and it consequently increases the keeping qualities.

Tetralin has been used also in combination with other products in internal combustion engines; in fact, quite a little work has been already carried out using Tetralin, particularly in aeroplane engine fuels and in various anti-knock compounds.

In Europe, quite considerable work has been done on the problem of the removal of printer's ink from old paper.

Tetralin is quite valuable as a crystallizing medium for substances which dissolve with difficulty in other solvents.

Tetralin has been used to quite an extent for the absorption of casing-head gas. This has been made the subject of several patents by Bregeat.

In conjunction with volatile mineral oils, heavy benzine or solvent naphtha, it is used in book-printing establishments for washing and cleaning the rollers and the printer's type.

Decalin

In the hydrogenation of naphthalene into tetra-hydro-naphthalene four atoms of hydrogen are introduced, as the name implies, whereas in deca-hydro-naphthalene there is a complete saturation with hydrogen, and the resulting compound is, therefore, not easily susceptible to chemical reactions. Decalin has a boiling point of 188 deg. Cent., a flash point of 57 deg. Cent. and a specific gravity of 0.895. Decalin, the same as Tetralin, evaporates without leaving any residue. It possesses a somewhat higher evaporating speed than Tetralin. It is a transparent liquid with a rather pleasant odor, and serves as a highly suitable thinner. Decalin has been sold abroad as refined Tetralin. It will not cause any decoloring even in white lacquer.

On account of its high solvent power it has been suggested and used in various forms of paint and varnish removers.

Decalin, like Tetralin, can be brought into watery solution by the use of a small addition of Hexalin soap.

Hexalin

Hexalin is the abbreviated designation for Cyclohexanol or hexa-hydro-phenol, and is produced by the hydrogenation of pure phenol. It is a neutral water-white liquid and, like all higher alcohols, does not dissolve readily in water. It has a specific gravity of 0.945 (7.9 pounds to the gallon) and boils at 155 to 160 deg. Cent. Its flash point lies at about 68 deg. Cent. It will not decolorize on standing, and is very stable even at the boiling point and evaporates without leaving a residue. Like amyl alcohol, Hexalin has a high dissolving capacity for solid and liquid hydrocarbons, fats, oils, resins, waxes and the like.

Hexalin for Resins, Synthetic and Natural.—The high dissolving power of Hexalin is of great importance; as, for instance, in connection with phenol formaldehyde condensation products. It has been found that Hexalin mixed with Decalin possesses an excellent solvent capacity for resins and shows in particular the property of easily dissolving the condensation products of phenol and formaldehyde, which, as is well known, are not soluble at all, or not easily soluble in numerous solvents. In fact, a solution of these synthetic resins in a Hexalin-Decalin medium furnishes clear and durable solutions even when diluted with non-solvents. The solution obtained is suitable for lacquering wood and other substances, and does not dry any more slowly than turpentine lacquers, and leaves the resin in the form of a clear coating hard to remove from the foundation.

In connection with the dissolving of synthetic resins, other combinations of these solvents can be employed as, for instance, Hexalin can be substituted by one of its esters, namely Hexalin Acetate and the Decalin (decar-hydro-naphthalene) can be substituted by Tetralin (tetra-hydro-naphthalene).

Pure Hexalin is a viscous liquid whereas its esters possess greater fluidity. The substitution, therefore, of the ester renders possible the manufacture of more highly concentrated solutions.

Hexalin has a high solvent power for natural resins, even the unmelted copals such as Manila and Kauri copal. As a solvent for these natural resins Hexalin can be substituted by its homologue, Methyl Hexalin.

In using these solvents it is possible in the first place to avoid the bothersome melting of the natural resins, and in the second place it is possible in the case of artificial resins to reach highly concentrated solutions suitable for coating purposes.

The viscous solution obtained by the dissolving of copal, for instance, in Hexalin Acetate may, without becoming turbid, be thinned with other thinning agents which are non-solvents, so for instance xylol. Additions of linseed oil and other oils may also be made without any separation of the dissolved resin. Xylol is mentioned as a thinner simply as an example because other products such as benzine, benzol, Tetralin, etc., can be used just as well.

Liquid Siccatives.—Metal resinates or linseed oleates of metals easily dissolve in Hexalin or its esters. It is, therefore, used with advantage in the manufacture of liquid siccatives. One of the advantages of the use of Hexalin and its esters is that they combine with a relatively low inflammability a high dissolving capacity for the metal resinates, etc., and evaporate without the formation of residue at a sufficient rate of speed.

Linoxyn Solutions.—Linoxyn has been used to a great extent in the manufacturing of linoleum, but its application in the lacquer industry has been restricted because of the difficulty of finding a suitable solvent. It is true that Linoxyn becomes soluble in amyl alcohol and amyl acetate, but such solutions require months for their manufacture in order to remain clear and transparent. It has been found that clear, tranparent and non-depositing solutions which can be further thinned with other lacquer solvents, can be obtained by the use of Cyclohexanol or Cyclohexanone. The solutions obtained dry to an originally sticky, but gradually tough and elastic film. The drying, of course, can be accelerated by the addition of siccatives. Linoxyn solutions are serviceable not only in the lacquer and varnish industry, but can be used in the manufacture of linoleum, artificial leather, etc.

Rubber Dissolving Agent.—Cyclohexanol or its conversion products are capable of dissolving both crude and vulcanized rubber. Crude rubber can be wholly or partly dissolved with well-known volatile solvents, such as benzine, benzol, carbon-tetra-chloride, etc., and vulcanized rubber with xylene, aniline, etc., in order to subsequently subject it to further treatment after removing the foreign ingredients and eliminating the solvents. In a number of the solvents the rubber swells up well, but is only partly dissolved. Large quantities of the solvent are consequently required which afterward have to be recovered. On the other hand, some of the solvents have the disadvantage that their solvent power is exerted only at relatively high temperatures.

It has been found that Cyclohexanol and its esters as well as Cyclohexanone exercise a solvent action both quickly and perfectly and at lower temperatures than is the case with most other solvents. Even where high temperature is worked with the high boiling point of the Cyclohexanol and the reduced fire risk afford great advantages.

Combination of Celluloid and Rubber.—It is well known that the difficulty of making a combination of celluloid and rubber is in the finding of a solvent in which both rubber and celloid are simultaneously soluble. A number of the most common solvents of celluloid, such as acetone and amyl acetate, act as precipitating agents for rubber from its solution, while on the other hand celluloid is entirely insoluble in a number of the rubber solvents, such as carbon-tetra-chloride, carbon disulphide, etc.

It has been found that celluloid can be dissolved in Hexalin and that rubber can also be dissolved in Hexalin and the two solutions afterward combined. If this mixture is then applied to a glass plate, for instance, and the solvent allowed to evaporate, a fine celluloid-rubber film is obtained. It is, of course, possible to make some substitution of solvents as, for instance, Methyl Hexalin in place of Hexalin and various proportions of celluloid and rubber can also be used, depending on the result that is desired.

Homogeneous Liquid Mixtures.—Hexalin is valuable as a homogenizer when added to certain other solvents which by themselves are not miscible either with each other or with water. Also there are some solvents which are miscible with water in some proportions, but separate on great dilution. Other solvents will mix with each other, but are not clear. As an instance of this, a mixture of 40 parts of Tetralin (tetra-hydro-naphthalene) and 60 parts of spirit form milky emulsions, whereas by the addition of 5 parts of Cyclohexanol these are converted into genuine solutions. Methyl Cyclohexanol and Cyclohexanone have the same properties in this respect.

In the case of Tetralin it is not directly miscible with water, but if the Tetralin is combined with some soluble oil, or soap and a small percentage of Cyclohexanol added, the resulting mixture can be carried to practically any dilution with water without any separation of the solvents whatever.

This homogenization is of value, too, in the lacquer industry as, by the use of Cyclohexanol, disturbances in compound solvents are avoided. The elimination of any water in solutions of artificial and natural resins or other basic lacquer substances, such as nitrated or acetylated cellulose, has a disturbing effect and prevents the products from drying in a smooth layer. In this connection Cyclohexanol and its homologue Cyclohexanone have been found very valuable.

Emulsifying Agents.—The high dissolving capacity of Hexalin and Methyl Hexalin and their ability to form with watery soap solutions perfectly clear solutions which in turn possess high emulsifying properties has led to their use in the preparation of spinning oils, loom oils, etc., which are readily washed out with water.

It has been found that Cyclohexanol, which is itself insoluble in water, can be easily incorporated in an ordinary soap body and that this dissolved in water results in entirely clear dilutions which even under ordinary temperature conditions possess a high dissolving and emulsifying property for neutral fats, waxes, fatty acids, solid and liquid hydrocarbons. These Cyclohexanol-soap mixtures can be used either solid, semi-solid or liquid wherever the removal of fatty substances is involved as, for instance, in the textile or leather industries; and besides they afford excellent emulsifiers for all substances which cannot be easily, if at all, affected by watery soap solutions.

Hexalin in Soap.—Hexalin has an odor not unpleasant, but somewhat like a light menthol and is not changed by storing or by a slow evaporation. Its water-white oily

character gives it a general appearance somewhat like distilled glycerine.

Hexalin is now used quite extensively in the soap industry, being incorporated in both hard and soft soaps, such incorporation increasing enormously the detergent properties and general efficiency of the soaps without altering in any way the physical appearance of the soap.

Hexalin, for incorporation in soap, is much superior to the usual organic solvents used in the past because of its property of readily dissolving fats, oils, resin, etc. The use of soaps prepared in this way is not confined to the textile industry, but finds a great value in the laundry and general household field because of the easy removal of dirt, fat, oil and even blood stains. In the presence of Hexalin blood loses the capacity to coagulate.

Another point of great interest is that where Hexalin is incorporated in a soap, other solvents such as Tetralin, benzol, carbon-tetra-chloride and turpentine can be incorporated also if desired and the resulting soap will produce homogeneous, water soluble products, which remain soluble in water even in weak water solutions.

The peculiar odor of Hexalin is not disagreeable during the washing process and has no harmful effect on the workmen. It is also of importance to know that this odor does not adhere to the material, which after rinsing becomes absolutely odorless.

Hexalin in soaps will also dissolve such water insoluble substances as magnesium and lime soaps. If hard water is used the disagreeable feature of sticky precipitates of lime soaps is thus eliminated. Small additions of Hexalin do not affect the foaming of the soap. Larger additions, however, do act in the same way as equally large additions of alcohol.

The presence of Hexalin in neutral soaps has the effect of retarding, up to a considerable degree of dilution, the hydrolysis of the soap.

The viscosity of Hexalin soap is reduced on the addition of more Hexalin, but is increased by the addition of approximately 25 per cent of water. As previously stated, Hexalin soaps remain entirely soluble even when diluted to the greatest extent with water. The phenomenon of gelatinization on an addition of a small amount of water is increased or diminished according to the fatty basis of the soap and vanishes entirely when cocoanut or palm kernel oil is used as the basis.

In the production of liquid, soft, filled soap, half curd soap, with Hexalin, the additions of Hexalin are made along with the whole quantities of fats, put into the kettle and then warmed up. Fats or fat acids are thereby dissolved and are much easier and better saponified than without the use of Hexalin.

In the manufacture of hard soap in salt-lye or spent-lye, the precipitates must be drawn off before the Hexalin is added. If one adds these at the start, a large part thereof would combine with the spent-lye.

Hexalin will change the character of the soap compound to such an extent that the salting-out of the soap becomes difficult. Even pure tallow soaps or such soaps made mainly out of solid fats, acquire by the use of Hexalin the properties of glue soap or castor oil soap.

Hexalin should not be added in its pure form to the hard soap mass. It should be made into a watery potash or soda soap, which can be mixed with the former without difficulty. However, it is important that all of these solutions are quite hot when put together, and they must be stirred thoroughly to get a uniform distribution of the Hexalin.

Hexalin in Lacquer.—Hexalin, although an alcohol, is a solvent for nitrocellulose, but on account of its high boiling point and its somewhat slow action on the cotton, is not recommended as the sole solvent agent and should therefore be used in conjunction with the other lower boiling solvents. It is also a solvent for the various types of gums used in the lacquer industry and is a valuable addition to the present solvents because it prevents, being the last constituent to evaporate, a separation of the nitrocellulose and the gum and so produces an ideal film of highly glossy appearance. Its boiling range not only prevents blushing under the most severe conditions, but also produces a better flow in the application of the lacquer and a film free from orange peel. It has also been found to promote an even distribution of the pigment throughout the lacquer where pigmented lacquers are in use.

The use of Hexalin as a plasticizer is continually increasing.

Miscellaneous Uses

Hexalin has been used for a great number of miscellaneous uses of which the following are a few:

In the manufacture of shoe creams and other polishes the high solvent powers of Hexalin have been found very valuable in dissolving the waxes and other substances used and furthermore its comparatively slow speed of evaporation makes its use in these polishing creams very valuable in preventing a quick drying out and a caking of the polishes.

Cyclohexanol has been suggested and experimented with in various processes of regenerating newspaper; that is to say, the removal of the ink and the recovery of a clean paper stock.

In the preservation of wood Cyclohexanol has been used, in which case its own fungicide effect is of value and, besides, when converted into a watery solution or emulsion and acting as a carrier for other substances used, its high powers of penetration make it of particular value.

Hexalin has also been used in the preparation of fuels. Pure Cyclohexanol, on account of its sirupy condition, cannot be used at once for the purpose, but a slight addition of one of its esters or of its homologue, Cyclohexanone, reduces the viscosity to such a point that it can be used without further difficulty. In the same way Decalin (deca-hydro-naphthalene) can be added to it for the same purpose.

Cyclohexanone

Cyclohexanone is a colorless liquid with an odor resembling somewhat that of acetone. It has a boiling point of 155 to 160 deg. Cent., specific gravity of .95, freezing point minus 45 deg. Cent. It distills without decomposition and may be steam distilled quantitatively from its mixtures. It is non-toxic and does not attack metals. Cyclohexanone is produced simultaneously in the process of producing Hexalin.

Cyclohexanone is used in varnish, paint, enamel, polish, aviation dope, celluloid, film, artificial leather, linoleum, rubber and water-proofing industries.

In the lacquer industry Cyclohexanone is used as a solvent of the "medium boiler" type, assisting the flow of the lacquer over the surface and also preventing blushing or chilling. Owing to the comparatively low volatility of Cyclohexanone lacquers made with this solvent can be brushed as well as sprayed on.

Nitrocellulose is readily soluble in Cyclohexanone, giving clear solutions. Celluloid is also readily soluble.

Cyclohexanone is miscible in all proportions with buyl acetate, acetone, turpentine and alcohol.

Hexalin Acetate

This is a colorless liquid with a typical ester-like odor. It is made by the esterification of Cyclohexanol. It has a boiling point of 175 to 185 deg. Cent., specific gravity .95. It is non-miscible with water and distills without decomposition.

Hexalin Acetate is a good solvent for soft and hard natural resins and gums (including hard copals) shellac, nitrocellulose, celluloid, crude rubber, fats, oils (fixed, mineral and essential), and waxes. Hexaline Acetate is similar in its properties and actions to butyl acetate and amyl acetate, but has, of course, a higher boiling point. This ester of Hexalin has not, up to the present time, found nearly as large a use as the alcohol, Hexalin itself.

Methyl Hexalin

This is sometimes also called Heptalin. Methyl Hexalin is a mixture of the three isomeric Methyl Cyclohexanols obtained by the hydrogenation of cresol. During the process of hydrogenation the acid character is lost entirely, the resulting product is completely neutral and the odor is also entirely changed; in fact, instead of being rather disagreeable, the resulting material has an odor rather suggesting camphor or menthol and does not change either in long storing or by slow evaporation. Methyl Hexalin boils at between 160 to 180 deg. Cent. Its specific gravity is .93 at 15 deg. Cent. and the flash point the same as with Hexalin lies at about 68 deg. Cent. The dissolving capacity of Methyl Hexalin for fats, oils, waxes, resins, etc., is about the same as that of Hexalin.

The greatest use of Methyl Hexalin is in connection with the manufacture of soaps and other detergent compounds as it forms with soaps of ordinary fatty acids solution mixtures which themselves possess a high dissolving and emulsifying capacity for organic substances which are insoluble in water. For these reasons Methyl Hexalin is largely used in the manufacture of solid, semi-solid and liquid soaps. As in all more highly molecular alcohols, the solubility of Hexalin and Methyl Hexalin in water is but slight while watery soap solutions are capable of absorbing large quantities of these solvents. Olein potash soap with a content of about 2 per cent of water dissolves any desired quantity of Hexalin, and small percentage soap solutions with as little as 5 per cent soap content still absorb Hexalin to the extent of many times this small soap content. For Methyl Hexalin the solubility in watery soap solutions is somewhat less, but in most cases it is also substantially higher than double the soap content. A valuable fact is that Methyl Hexalin easily dissolves magnesium and lime soaps and this dissolving capacity is maintained in a watery soap solution so that such a preparation, used where hard water conditions prevail, is extremely valuable. By the addition of Methyl Hexalin it is possible to make solid, semi-solid or liquid soaps of various compositions. The Methyl Hexalin can, however, be added as such to the washing liquor after the ordinarily used quantity of soap has been reduced by about one-half. The presence of Methyl Hexalin in soap also makes possible scouring operations at much lower temperature and for much shorter duration as the high solvent and cleansing power is made effective even at low temperatures. Where a very high temperature is used, however, the loss of solvent need not be feared owing to the high boiling point of Methyl Hexalin as compared with other organic solvents.

The following few examples give sufficient general information as to the use of Methyl Hexalin in soap:

Liquid Soap

29½ pounds Olein
35¼ pounds Methyl Hexalin
11¾ pounds Potash Lye 50 deg. Be.
23½ pounds water.

100 pounds.

The fat is usually heated with the Methyl Hexalin and then the lye added for saponification.

As an example of a semi-solid soap the following is given:

35 4/10 pounds Olein
21 3/10 pounds Methyl Hexalin
3 7/10 pounds Potash Lye 50 deg. Be.
18 3/10 pounds Soda Lye 36 deg. Be.
21 3/10 pounds water.

100 pounds.

These can be made as cold stirred soaps without heating. Methyl Hexalin can also be added to a ready-made curd soap by adding to the still liquid curd soap up to 25 per cent of a Methyl Hexalin soap solution.

The Methyl Hexalin soaps alone can be regarded as spot-removing soaps, but they can be further utilized for special spot or stain removing soaps soluble in water as, for instance, the following:

22¾ pounds Linseed Oil
34¼ pounds Methyl Hexalin
9¼ pounds Potash Lye
13¾ pounds water.

And after the saponification has taken place and the mass is cooled, twenty pounds of Tetralin are added.

CHEMICAL EQUIPMENT EXPOSITION DRAWS 2,000

An outstanding feature of the Chemical Equipment and Process Engineering Exposition held in the Public Auditorium, Cleveland, Ohio, during the week of May 10-15, inclusive, under the direction of the Association of Chemical Equipment Manufacturers, was the co-sponsorship of the exposition by a group of technical organizations embracing practically the entire range of modern engineering and industrial technical science.

More than two thousand technical and industrial men, representing every branch of industry in which processing plays a part, registered during the exposition. Registrants came from twenty-eight States, Sweden, Hungary, Germany and Canada.

Sessions, dinners and luncheons of the various technical organizations co-operating with the association occurred throughout the week. Major General Amos A. Fries, Chief, Chemical Warfare Service, U. S. A.; Benedict Crowell, formerly Assistant Secretary of War; Dr. C. H. Herty, president of the Synthetic Organic Manufacturers' Association; A. E. Marshall, consulting engineer; H. H. Dow, president, Dow Chemical Company; G. O. Carter, president of the Association of Chemical Equipment Manufacturers; Colin G. Fink, Professor of Chemical Engineering of Columbia University, and D. J. Price, Chief of the Bureau of Chemistry, U. S. Department of Agriculture, were among the more than thirty speakers who participated in the technical program of the week.

UNMARKED DYES TO BE SEIZED

Dyes entering the United States not marked as required by law will be seized as illegally imported, Collectors of Customs have been advised by Assistant Secretary of the Treasury L. C. Andrews. In two Treasury decisions, importations of coal tar dyes, colors, etc., were held not admissible to entry unless the invoice and the immediate containers bore the descriptive statement prescribed in paragraph 28 of the Tariff act.

FALL COLORS FOR KNITTED OUTERWEAR

The Color Card Committee of the National Knitted Outerwear Association announces the selection, in co-operation with the Textile Color Card Association of America, of the colors recommended for the fall of 1926.

The tendency is still marked toward the brighter shades. The first four colors are crayon shades, particularly recommended for resort wear:

Cloud Gray, Crayon Blue, Surf Green, Crushed Violets, Phantom Red, Gypsy Red, Parrot (green), Steel Blue, Roman Violet, Suntan, Aladdin (reddish tan), Midnight Sun (brilliant burnt orange).

A color card showing each of the twelve shades dyed in wool yarn will be ready for distribution shortly.

BUREAU OF STANDARDS LISTING TEXTILE LABORATORIES

The Bureau of Standards, Washington, D. C., is compiling a list of commercial textile testing laboratories, and would like to be advised of the names and addresses of all laboratories in this field. They are anxious to have their list of laboratories equipped to do testing in the textile field as complete as possible. George K. Burgess, Director of the Bureau of Standards, states that he would like all laboratories equipped to do textile testing to send in their names and addresses.

KLAUDER WELDON PLANT ACQUIRED BY BUTTERWORTH

The plant, stock, ground and equipment of the Klauder Weldon Dyeing Machinery Company, at Bethayres, Pa., which went into the hands of a receiver in December, 1925, was purchased at the receiver's sale on May 14 by H. W. Butterworth & Sons Company, Philadelphia.

The Klauder Weldon plant, which will now be known as the Klauder Weldon Division of the Butterworth Company, comprises six buildings and embraces twenty acres of ground at Bethayres. All the buildings are iron and concrete construction, and practically new. Complete iron and brass foundries are included as part of the plant.

It is expected that the plant will be in operation within a few weeks, or just as soon as final settlement can be made.

The Roessler & Hasslacher Chemical Company is celebrating the forty-fifth anniversary of the founding of the firm.

The Dyeing of Hatters' Felt

Mechanism of the Dyeing Process—Structural Make-up of the Fiber—Special Coloring Methods—Action of Glauber Salt—Dyeing in the Unfinished Condition—Dyeing with Chrome Developed Dyes—Dyeing in the Finished Condition

By S. MARION

(*Melliand's Textilberichte*, 1925, 30*ff.*)

Translated by Ismar Ginsberg, B. Sc., Chem. Eng.

BEFORE going into a discussion of the dyeing of hair felt, it is necessary to elucidate certain theoretical fundamental principles which go far in explaining the mechanism of the dyeing process. It is a field which has seen much discussion and speculation, for there are theories which represent the dyeing process as a pure chemical operation and make the formation of a difficultly soluble salt the reason for the color being produced on the fabric. There are on the other hand other theories which say that the color is formed through a colloidal-chemical reaction and which talk about a "solid solution" of the coloring matter on the dyed material. It is nevertheless undoubtedly true that there are several processes which take place either simultaneously or one right after the other. The latest studies on this subject have made it quite clear that the dyeing process is composed of a series of complicated reactions which can scarcely be explained on pure chemical or pure colloidal-chemical grounds, but it is much rather a combination of the two sorts of reactions. It is therefore the purpose of the author to investigate the dyeing process first from this standpoint in order to supply a certain deficiency of accurate information that is available on this subject.

The fact that the organic coloring matters which are used for this purpose possess to a greater or lesser degree colloidal characteristics is scarcely to be doubted. For the coloring matters, just like the soaps, are salts of more or less strong acids with bases, which have a large number of atoms in the molecule. The colloidal character of these substances is known by their slight degree of dialysis through membranes, their ability to be salted out of solution and to be precipitated by colloids which are oppositely charged. Furthermore, the ultramicroscopic investigation shows that most solutions of coloring matters are full of particles of ultra-micrographic size.

Two important properties of the solution of coloring matter are its osmotic pressure and electric conductivity. There are many coloring matters which do not diffuse through membranes but which behave as solutions of electrolytes as far as electrical conductivity and molecular weight determinations are concerned. Then again the osmotic pressure is found to be equal to that which is calculated from the molecular weight while a higher osmotic pressure is expected, due to the fact that the dye salt is electrolytically dissociated.

The dyer wants to use such coloring matters that possess the power of entering into the internal structure of the animal or vegetable fiber which is being dyed and which is thereafter held by the fiber and resist the action of washing. It has been represented that the dyeing is a solution of the coloring matter in the fiber, but this is a possible phenomenon only when the fiber is a homogeneous substance. This is scarcely true and the newest tests that have been made on fibers with the aid of the X-ray seem to indicate that they are not structureless, but that they possess an ultra-microscopic structure and that between the micellae there are to be found hollow spaces which can be filled with a liquid. This leads to a theory of dyeing according to which the coloring takes place through a concentration of the coloring matter by diffusion into the hollow spaces between the micellae. This theory is designated as the adsorption theory. These two theories, nevertheless, do not explain why the dyeing is fast to washing, for solubility and adsorption are completely reversible processes.

The chemical theory assumes that the formation of a fast color on the fiber is due to the formation of a difficultly soluble salt. Thus, in the case of wool, it is said that there is a sort of acid in the fiber, known as lanugin acid, which is an amorphous body and which can give insoluble compounds both with acids and with bases. However, this theory will not explain the dyeing of cotton by dyes that belong to the benzidine class of coloring matters, for the cellulose fiber can scarcely be considered to enter into such reactions. It follows that the retention of the coloring matter on the fiber, in spite of washing, can be explained only when both theories are employed.

Structural Make-up

The starting point in the discussion is the assumption that the fiber possesses structure; consequently that the fiber is a gel with micellae which are separated from one another by hollow spaces. According to X-ray examination the cellulose fiber gives a clear spectrum and behaves

just like paper, wood and ramie. Silk has a line spectrum with few distinct lines, while wool and the other animal hairs appear to be amorphous. Cotton, just like any other crystalline substance whose atoms are arranged in a definite spatial order, is much less absorbent. It has also been determined in the experiments which were made by the author that a fiber will adsorb more substance from a solution, the more the surface tension of the solvent is lowered. Nevertheless, as the acid and basic coloring matters are used in the form of their easily soluble alkali salts, and as they are markedly dissociated in a electrolytic manner in their solutions, the surface tension of the solvent is rather raised than lowered. On the other hand, the so-called substantive coloring matters (direct cotton dyes) are found as salts of the carboxylic and sulphonic acids of polyazo and tetrazo compounds in their solutions at the apex of the semi-colloidal or entirely colloidal coloring matters.

Nevertheless, the slightly crystalline or entirely non-crystallines animal fibers behave entirely differently. They possess a high degree of adsorptivity, and the adsorption takes place within the internal structure of the micellae. The colloidal ions of the albumen micellae and those of the coloring matters, when they are charged with opposite electricity, show the tendency to come together at the poles. This heightens the tendency toward adsorption. At the same time, the formation of a difficultly soluble salt can increase the fastness of the coloring matter.

In conclusion, it can be said that in dyeing operations the structural make-up of the fiber is of importance. It is also important that the micellae surfaces of the fibers be electrically charged and that the individual fibers, due to the active valency force, possess a greater or lesser degree of adsorption. The coloring matters are, according to their chemical composition, more or less easily soluble color salts and in the same measure more or less easily adsorbable. It is possible to alter the adsorptivity of a coloring matter by the addition of acids or bases, or by neutralization, making it greater or less, which results in the change in the electrical charge on the micellae. It is also possible at the same time to enhance or retard the formation of easily adsorptive color ions of colloidal character, so that it follows that the ions play a very important role.

Special Coloring Methods

There is no substance which has to be dyed that requires so careful a carrying out of details and such particular results as the hair of the hare or rabbit. The directions that are given to accompany the dyestuffs are therefore of general character only, and the practical man must modify them to suit his own particular needs. In the first place, the color of the hair or felt itself is scarcely the same at all times, as the different hair that is employed in making the felt varies considerably in shade. In the second place, it is of the utmost importance that not every matting of hair, even though it possesses the same coloring, will absorb the coloring matter in the same manner. There are some, for example, which are dyed a much darker shade than others with the same coloring matter. The dyeing process as a colloidal chemical process is dependent on the colloidal state of the hair gel. In the third place, it must be reckoned with that the hair, before processing, is mordanted with a strong acid liquor and the concentration of this acid mordant liquor is not maintained the same by the various plants that manufacture the hair felt. Furthermore, it is also a fact that many hairs contain a greater proportion of combined acid than others; and then, again, neither have the acid hair stocks been allowed to remain quiescent for the same length of time before they are further processed. As the felt is allowed to remain for a greater length of time, the acid mordant sinks into the inner surfaces of the hair gel and after a while impregnates the gel in its entirety, while freshly mordanted hair felt contains the mordant practically entirely on the surface alone.

Then, when such materials are dyed with acid coloring matters, for example, the dyestuff fastens itself to the outer layer of the hair and the result is that the freshly mordanted hair stock will always be of a darker color and more irregular shade than that which has been permitted to remain for a prolonged period of time. In the fourth place, the attainment of the desired shade depends on the thickness and compactness of the hair felt that is being colored. Thicker and more compact felts give much darker shades than the thinner and less compact materials, as in the firs case the coloring matter penetrates into the interior of the mass much less easily and less rapidly than when the felt mass is not so compact.

There are also a number of other factors which influence the results obtained in the dyeing of hair felt, but which cannot be considered here for want of space. The dyer has therefore always to contend with this condition: that he will have to overcome all sorts of difficulties and that he will encounter inconvenient and surprising results when he does not give the utmost care to all the intimate details of the dyeing process, and when he does not first take into consideration the possible effects of all these factors before he undertakes to dye the hair felt.

The dyeing takes place either in the unfinished condition or in the finished felted stage. The dyeing in the unfinished condition possesses the advantage that, due to the looser state of the material, better penetration of the coloring matter is insured. In the felted state thorough impregnation with the dyestuff is more difficult and the material has to be treated for a longer time in the boiling hot dye liquor. This, of course, makes it dangerous that the material itself will be injured to a certain extent by the treatment. On the other hand, it is true that the hair in the unfinished

state exhibits certain irregularities which result in a cloudy condition after it is dyed. The finished material is, moreover, not so delicate from this standpoint and there is less difficulty encountered in securing an even dyeing.

Both the coloring matters and the processes which are used in applying them to the hair fibers must be such that the highest degree of fastness is obtained, for the colored material after dyeing must be processed further and subjected to various operations, treatments with boiling-hot water, stiffening with various sizing preparations, rubbing, steaming and pressing. Because of the great sensitiveness of the rabbit and hare felt toward even such weak alkalies, the use of basic and vat coloring matters is prohibitive. Only the substantive diamine coloring matters, the acid and chrome developed dyestuffs can be considered for this purpose. Nevertheless, the greatest care is necessary in using the substantive diamine coloring matters. When they are used for this purpose, it follows that the dye liquor as well as the material being dyed is as free as possible from acids, a condition which must be very strictly observed if good results are to be expected. It is impossible to obtain good even colors with these dyestuffs when the hair felt has been mordanted just a short time before. Only such hair stocks which have been allowed to remain for a year after mordanting will give good results when dyed with these coloring matters. The coloring process is quite short and the appearance of the material is materially enhanced, but as far as the lasting qualities are concerned there is much to be wished for.

Action of Glauber Salt on Felt

The acid coloring matters and the chrome-developed dyestuffs are the ones which yield the most fat and most uniform results on hair stock. In the latter case, however, when very fine felts are being dyed it is a question whether or not the fibers are impaired by the treatment to which they are subjected in the dyeing process. It is for this reason that in the past few years dyestuffs of the acid series have been developed which are possessed of a higher degree of fastness and which are particularly well adapted for dyeing hair felts. On the other hand, these coloring matters do not give the best of results from the standpoint of uniformity of color. In their use a large proportion of Glauber salt must be employed. Then, again, large quantities of this neutral salt have a deleterious action on the hair fiber. The fibers appear to lose under these conditions a large amount of their strength and felting qualities, and hence it is a difficult matter thereafter to felt them together. This state of affairs is very significant, and steps must be taken to see that too much of the Glauber salt is not added to the color bath.

The action of this salt can be explained readily enough. It reduces the swelling power of the fibers, acting as it does as a salting-out agent on the colloid of the fiber. It converts the elastic gel into an inelastic variety which cannot felt properly. Then, again, when finishing the felting of the dyed fibers the liquor that is employed for this purpose must be kept at the same acidity as the dye liquor if "bleeding" of the color is to be prevented. This is a difficult matter to regulate in the large dyeing establishment, but if this condition is not observed, then the hair felt is very apt to be dyed in a number of different shades instead of in one uniform color. In selecting the coloring matter it is necessary to pick the one best suited for dyeing the particular quality of felt which is being handled. Thus, for the flat hat, which is not to be brushed, acid and substantive diamine coloring matters are more indicated than for the velour hat, which is almost always colored with chrome-developed dyestuffs, so that the color may be retained in spite of the repeated brushings with boiling-hot water.

Dyeing in the Unfinished Condition

Dyeing of the felt in the unfinished state is carried out mostly just for the light and moderately dark tones. The coloring matter and the potassium chromate employed in the dyeing of dark shades must be employed in such large proportions that the felting qualities of the hair are impaired, with the result that the finishing operations do not give a felt of the proper quality. When it is desired to produce dark shades with the chrome-developed coloring matters, then it is most advisable to subject the fibers to a preliminary chrome treatment and then fix the coloring matter on them, in place of the usual after-chrome treatment. The preliminary chrome treatment allows the use of larger amounts of the chromium mordant than would be otherwise permissible without damaging the fiber. It is the author's opinion that this phenomenon can be readily explained with the aid of the principles of colloid chemistry.

What is conceived to happen is that the chromium hydroxide is precipitated from the chromium salt onto the fiber, and there exerts a protective action on the albuminous micellae. In this manner it is possible to fix as much as 5 per cent by weight of the chromium salt on the fiber without injuring it in any manner. Things are quite different in the case of the after-chrome treatment, for there the dye liquor, which is full of neutral salts due to the dyeing, has the effect of increasing the tendency of the chromium hydroxide to coagulate and leads further to the coagulation of the chrome hydroxide-albumin-color micellae.

The coloring process is carried out somewhat as follows: The unfinished felt is made available in as neutral a condition as possible. It is first wet with water at a temperature of 40 to 50 deg. Cent. for a period of thirty minutes. Then it is washed with cold

water. In the meantime the color bath is being prepared. The properly weighed-out coloring matter and the other ingredients that are added are mixed together in an earthenware pot with a little warm water for so long a time until a uniform paste is obtained in which there are no solid lumps. Then the mixture is diluted with additional warm water. This mixture is then pased through a fine meshed screen and filled into the dye vat, which contains warm water to one-fourth of its total capacity. The dye composition that remains on the screen is often rubbed with a suitable tool and then washed off with water.

The dye liquor obtained in this manner is then brought up to the boiling temperature and maintained at that temperature for a few minutes. Then the vat is filled with cold water. Due to the injurious action of Glauber salt, it is customary to keep the proportion of that chemical down to 5 per cent in the dye liquor. The author must refer to the practice that seems to be common among the makers of coloring matters in recommending the use of considerable of this salt with the sole purpose of obtaining uniform results in the dyeing without really giving any consideration to the equally important matter of the harmful action of this chemical on the fibers that are being dyed.

The dye liquor is made with the addition of from 1½ to 2 per cent of acetic acid. The unfinished felt is then added to the liquor. After it has been stirred around in the cold for approximately fifteen minutes, the temperature is allowed to rise gradually and within a period of forty-five minutes the liquor is brought up to the boiling temperature. After boiling for a few minutes it is generally found that the outermost side of the fiber is more deeply dyed than the inner parts, and it is then time to "turn." The materials being dyed are then lifted out of the dye liquor by means of suitable forked tools and placed on tables whereon the inner side of the material is brought to the outside. Then the material is placed in the liquor once again and the liquor is brought up to the boiling temperature and cooked at that point for a period of fifteen to twenty minutes. Too strong boiling is to be avoided. It is best to carry out the process with bubbles of steam just appearing on the surface of the liquor.

After this point has been reached in the dyeing of light and moderately dark shades, the dye liquor is mostly exhausted, the coloring matter has been absorbed on the surface of the fibers and has penetrated into the interior, but uniformity of color has not been attained. This process has been called "pigment dyeing." The chemical part of the dyeing is attained afterward by treatment of the material with stronger acids.

With this intent in view, from to 1½ per cent of sulphuric acid is added to the color bath and treatment with this acid liquor results in the uniform distribution of the coloring matter throughout the hair fibers. The fibers are heated with this liquor for twenty to thirty minutes. Then the material is turned again and the other side is treated with the same proportion of sulphuric acid. In the case of coloring matters which are difficult to dye in even shades, the use of sulphuric acid has often the exact opposite effect, in that it darkens those parts of the fibers that are dyed more darkly. Under such circumstances it is advisable to employ acetic acid or formic acid in the place of sulphuric acid. On the other hand, there are coloring matters which are not absorbed by the fibers at all, or, at any rate, very little from a bath which is acid with acetic acid. Then, when sulphuric acid is added, these coloring matters fix themselves to the fibers very rapidly but very unevenly. After dyeing, the unfinished felt is washed well with water and then is ready for further processing.

In the acid bath dyeing the following faults are commonly encountered: Insufficient wetting of the fibers results in cloudy shades. When the unfinished felt contains a certain amount of acid, which is not estimated, then it is difficult to control the acid content of the color bath and bad results are obtained. Furthermore, faults are also caused by too weak or too strong boiling, by inaccurate control of the concentration of acid in the bath and by not maintaining the correct length of time in the cooking. The greatest difficulties are encountered in dyeing felts which have been prepared from freshly mordanted hair. Such felts must be permitted to remain in water at a temperature of 40 to 50 deg. Cent. for a prolonged period of time up to a maximum of twenty-four hours. This treatment results at least in partial dialysis of the acid into the wash water.

The author has investigated different processes which are claimed to counteract this condition. Neutralization with the aid of sodium bicarbonate or ammonia is not to be recommended, for it is known that every hat manufacturer and dyer who handles hat fabrics is so afraid of the use of alkalies that he would rather buy coloring matters that give him uneven shades instead. Especially unsuitable is neutralization of the liquor with the aid of sodium bicarbonate, for the carbon dioxide which is set free in the process has a bad effect on the physical condition of the felt. It is much more preferable to employ ammonia; but then, again, the result is doubtful. In addition and alongside neutral parts on the felt there may be found parts that have an acid reaction; and, of course, these different parts will dye differently. The acid appears to be so tightly fixed to the fibers that even when they are treated in wetting liquor which has been made alkaline the water which is pressed from the felt will react acid. The best way of getting rid of this acid in the felt is by dialysis in running water. Good results have been obtained with this method when employed on a small scale. There will probably be many

(Continued on page 370)

Proceedings of the American Association of Textile Chemists and Colorists

The American Association of Textile Chemists and Colorists

President
LOUIS A. OLNEY
Lowell Textile School, Lowell, Mass.

Vice-Presidents
WILLIAM D. LIVERMORE E. H. KILLHEFFER

Secretary
WALTER E. HADLEY
5 Mountain Avenue, Maplewood, N. J.

Treasurer
WINTHROP C. DURFEE
516 Atlantic Avenue, Boston, Mass.

Councilors
RALPH F. CULVER GEORGE A. MORAN
ARTHUR E. HIRST WILLIAM K. ROBBINS
WILLIAM R. MOORHOUSE WALTER M. SCOTT

LOCAL SECTIONS AND THEIR OFFICERS

Northern New England Section—
John F. Bannan, Chairman, M. T. Stevens & Sons Co., North Andover, Mass.
A. K. Johnson, Secretary, Lowell Textile School, Lowell, Mass.

Rhode Island Section—
Walter S. Williams, Chairman, Mount Hope Finishing Co., North Dighton, Mass.
Albro N. Dana, Secretary, Franklin Process Co., Providence, R. I.

New York Section—
Herbert Grandage, Chairman, Clark Thread Co., Newark, N. J.
Daniel P. Knowland, Secretary, Geigy Co., 89 Barclay Street, New York City.

Philadelphia Section—
Carl E. Medde, Chairman, E. I. du Pont de Nemours & Co.
Percival Theel, Secretary, Philadelphia Textile School, Philadelphia, Pa.

Southern Section—
Leonard S. Little, Chairman, Pacific Mills, Lyman, S. C.
Harry W. Ormand, Secretary, Union Bleachery, Greenville, S. C.

APRIL MEETING OF THE NORTHERN NEW ENGLAND SECTION

A very successful meeting of the Northern New England Section was held at the Y. M. C. A., Lawrence, Mass., on Saturday, April 24, 1926.

Ernest A. Johnson presented an interesting paper on "Worsted Finishing," and led the discussion which followed.

Hugh Christison very kindly served as emergency man in the unexpected absence of the second speaker, and spoke extemporaneously with much satisfaction to those present.

Chairman John F. Bannan held a brief business meeting at which committees were appointed to nominate officers and arrange for a summer outing in June.

The paper and business report follow:

A. K. JOHNSON, *Secretary.*

Business Meeting

Mr. Bannan—Gentlemen, we were unable to start as promptly as we had intended, because one of the speakers hasn't yet put in an appearance, and we waited for his sponsor, or his sponsors, who finally came without the speaker. But the other important speaker is here, and came promptly on time; after we get through with the business meeting we shall call upon him.

The first thing we have to settle is the appointment of two committees. In accordance with the custom of the different sections, officers are generally elected for one year, and they are encouraged or compelled to serve two years. I have been serving two years, and I am taking the liberty of appointing a committee that I think will nominate a new set of men—at least a new chairman; I hope they won't interfere with the secretary and treasurer, as they have been a great help to me, and will be equally valuable to my successor. On the Nomination Committee I have Harry Davies, Alan Claflin and George Moran.

I was going to mention the Outing Committee, but the first thing to decide is, shall we have an outing this summer? . . . An outing is agreed upon.

I always appoint good committees, so no doubt they will do the proper thing. Have you any suggestions to make before we appoint a committee.

Member—I make a suggestion that we have the outing at the Andover Country Club.

Mr. Bannan—Anybody second this? Any suggestions?

Member—Yes, you lose too many golf balls. (Laughter.)

Mr. Bannan—A motion has been made and been voted on to have an outing to take place at the Andover Country Club.

Member—Mr. Chairman, do we know that they'll have us there?

Mr. Bannan—Mr. Johnson can tell us.

Member—If there are no tennis courts, I should say no.

Mr. Bannan—Now, I'll appoint an Outing Committee, and when you see the names you'll say it is safe to leave it to them. The committee is Albert Sampson, F. L. McCool, George Stewart, Hugh Christison, Thomas Biery. Now you have heard the committee. Will you make that

a motion making the suggestion that the committee select a place?

. . . Motion made and seconded that the selection of a place for the outing be left to the committee. . . .

I have been requested to speak about the next annual meeting of the association which is to be held somewhere in the South, somewhere near Greenville. I don't know whether it's North Carolina or South Carolina, but according to the statements of the gentleman who gave us the invitation, traveling 150 miles to see things is nothing to be considered out of the ordinary; the important thing is to find out how many people are going. The council has not yet taken any positive steps, but if we could tell at the next meeting of the council that the Northern New England Section was going to send a good delegation, it would permit the council to determine what to do, whether to hire a special train, or go by automobile. As it will be some time in December, probably the traveling won't be very good for automobiles.

. . . Mr. Bannan then introduced the speaker of the evening, Ernest A. Johnson, agent of the Washington Mills, who spoke on worsted finishing. His address follows. . . .

Ernest A. Johnson—Mr. Chairman, Fellow Members of this Organization, and Their Guests: When Mr. Livermore called me up to ask me if I would speak on worsted finishing I hesitated quite a little while, before I finally gave my consent to do so, as most of you men are in too close touch with both the dyeing and finishing end of the business for anyone to try to lay down strict rules on finishing. I think you will agree with me that this is nearly impossible, because the conditions vary so much from one plant to another, and also on the class of goods. I have put down a few remarks here, however, which I will read to you.

The Finishing of Worsted Cloth

By Ernest A. Johnson
Agent, Washington Mills

I hesitate to say a great deal on this subject, as it would be very presumptuous on my part to state the best methods to use in finishing a piece of worsted cloth, for although I could suggest almost any way as the most advisable way, in my judgment, and give a very clear explanation backing up my suggestion, I appreciate that some of you may be able to give just as good an explanation why some other way, in your judgment, may be better. Finishing is a very broad subject, for so many things enter into it; for instance, take the single item of water. For mills situated on the Merrimac River, the water is soft, and our chemist tells me there are very few mills that have as good water for manufacturing as we have. The mills that make all their own yarn, and know all the changes in the blends of wool, have an advantage over the mill that buys all its yarn from the open market, so any points I may bring out are only my personal experiences, under our own particular environment, and may not be applicable in other places. I do not exactly know just what part of finishing you men are most interested to have me dwell on, but from the name of this organization, it would seem reasonable to me to give my opinion on the part which finishing plays in shaded or cloudy work. If I should say 75 per cent of the shaded and uneven dyeing is caused by faulty finishing, it may give the dyer too big a loophole to start blaming the finisher a great deal more than he has been doing, and should I say that 75 per cent of shading and uneven dyeing is caused from faulty dyeing and dyestuffs, it would give the finisher too big a loophole to blame the dyer. All departments in the mill need very close co-operation one with another, but none need such close co-operation as the dyeing and finishing. It is impossible to get good results without it.

Principal Causes of Shaded and Cloudy Goods

I have divided the principal causes of cloudy and shaded goods into two groups, the dyeing and the finishing; under dyeing four reasons, under finishing one reason, as follows:

Dyeing: (1) By using colors that do not work well one with the other in the bath. (2) Bringing goods to a boil too quickly. (3) Dyes used not thoroughly dissolved, and all solutions not thoroughly strained. (4) In speck dyeing with sumac and iron, the sumac becoming rank or sour.

Finishing: Finished goods sent into the dyehouse not evenly treated.

The one statement under finishing seems to cover the fault fully. Goods must be evenly clean, evenly dirty, evenly fulled (if fulled fabrics), evenly set by crabbing or steaming, or evenly softened or mellowed. For example, take a stiff piece of wrapping paper, work or rub it between your hands, and you can take part of the hardness out of it, and make it feel very pliable and soft in places. The very tightly woven fabrics must be worked until they are pliable all over, not merely until pliable or mellow in places. I said evenly dirty, because we speak of a piece being clean that is thoroughly scoured and thoroughly rinsed; evenly dirty because some fabrics will dye more evenly (by more evenly, we mean better penetration), and give more bloom to the color, by not giving a soap treatment before dyeing. This applies more to very tightly constructed cloths. If goods are sent into the dyehouse with these different uneven treatments which I have just mentioned, they are very apt to come out the same way. My experience has taught me that the largest

percentage of shaded and cloudy goods is caused by goods being unevenly prepared before dyeing. This does not say the finisher was not on to his job, for we must assume that the same style of goods have been running a certain way with perfect results, and that with no change in methods whatever the goods start coming shaded or clouded. Then by changing the route through which this style passes, the trouble is eliminated without making any change in dyeing whatever. The first thing to do when shaded or clouded goods start coming is for the finisher of the mill to get in touch with the dyer. They look these pieces over, both give their best judgment to one another as to the cause, and get busy to correct it. We hear it often said, and no doubt rightly, that it may be faulty wool scouring that is causing this shaded work. Granting it is faulty wool scouring, how can the wool scourer finish and dye the pieces evenly and how can we wait to correct this fault away back there. When these troubles arise, it is the duty and part of the dyer's and finisher's job to get together and suggest changes in either dyeing or finishing, or both, until the trouble is eliminated. The first place to start in the finishing, of course, is in the gray after mending, and each grade, length, width, weave and finish of each goods should be kept in separate sets or lots. Treat each different class of goods separately, as tight fabrics give harder treatment than soft or loosely woven fabrics; also set less in crabbing, or do not crab at all.

Crabbing and Steaming

When I first heard the name crabbing it made me very curious and puzzled, but I soon learned that crabbing meant passing the cloth through a trough of hot water and between weighted rolls to take the kinks out, and make a smoother and nicer piece of cloth. If we could only do this with some humans with like results, what a wonderful atmosphere we could make around us. I thoroughly believe the fewer operations we can put a piece of cloth through to obtain the desired finish is the ideal way, as the troubles are diminished. For level and even dyeing, eliminate as much as possible too severe treatment of the goods in the grease, or as they come from the loom. Try to do the severe treatments after scouring, or when the goods are clean. If you have to set the goods before scouring, use continuous crabbing as much as possible. If fabric is to be steamed in the grease, be very careful or you will get into trouble. It can be done successfully, but avoid it if at all possible. All steaming of cloth before or after dyeing either on sweet or sour dyed shades should be timed accurately. Steam should be used at a regulated pressure or temperature, and registered on a recording chart, so that if you have any trouble of any kind from steaming, you will have an accurate telltale of your steaming at all times. I have found these charts very helpful a great many times. The decating is also a very severe treatment of cloth, and needs constant care to avoid trouble.

Drying of Cloth

Now here is a very odd statement: I have not been able to prove to my own satisfaction that drying of cloth has caused uneven color. Many of you men may; I will not question your judgment on that point.

Pressing and Conditioning After Pressing

These operations are very important from a color standpoint. Should you press your goods unevenly, sides to center, or if goods are pressed evenly and in conditioning your goods after pressing, you remove more finish on the sides or centers, the goods will look shaded. This gives our customers the largest loophole to reject our goods for shaded sides to center. One of the rules I believe we all should adopt when we get into cloudy work is not to elaborate on the things that are right, but suggest ways where we may be wrong. Right ways and methods, I believe, cannot produce wrong results. What may be right methods to-day may be wrong methods tomorrow, and vice versa. Nothing aggravates me more than the man who is continually arguing how the methods he is using are right, when the results are wrong.

If I have brought out one point that has appealed to any one of you, or has given you a change of thought, I feel well repaid for coming here this evening.

Discussion

Mr. Bannan—Gentlemen, if you have any questions to ask of Mr. Johnson I am quite sure he will be ready to answer. In the mill they do not ask questions, they make statements; here we have a chance to ask questions.

Mr. Christison—Mr. Chairman, I think we ought to be especially grateful to Mr. Johnson for coming here, for he has read a good paper. This New England section should be the best section of the whole society, and Mr. Johnson has set a very good example and I hope that we can try, in a small way, to imitate what Mr. Johnson has done in bringing a paper here and in giving us something to think about.

Mr. Durfee—I would like to ask Mr. Johnson a question that to my knowledge has come up in several mills. I don't know whether he has to do with the dyeing, so I don't know whether it has been brought to his attention: that is, the difference between the long two-bath process as against the shorter single process of afterchroming, or chrome in the bath process on the finish of the cloth.

I know one large business that believes in the two-bath process, because the goods feel better, and they think they are more merchantable, and use the two-bath process simply because they believe goods are better feeling and fuller, and in every way desirable. They are willing to pay a good deal more money for the feel that comes from the longer double boiling. I would like to know whether in your experiences you have found that to be true or untrue.

Mr. Johnson—I want you men to feel that I will try to answer these questions. I want to say I feel more at home in answering questions than reading a paper.

Mr. Durfee has asked a very broad question. I believe certain goods do handle better with more treatment. Some fabrics need shorter or less treatment and certain goods need a longer treatment. Such fabrics especially feel better with longer treatment. I have had the same experience myself. I don't know whether that answers the question.

Mr. Durfee—That is the answer to the question. This manufacturer feels that it pays to give a much longer treatment.

A very large number of mills are now cutting out steam, and whether or not they are lowering the merchantability of their fabrics I don't know.

Mr. Johnson—I think that is all up to the individual manufacturers to determine in their own minds because after all I know from my own experience, and all the men I have met, we all want to turn out the best merchandise possible, and I question if there is any manufacturer who would want to save steam, and hurt the quality of his finished product.

Mr. Lane—I'd like to ask Mr. Johnson what, in his opinion, is the main reason for so-called lash marks on worsteds. You understand what I mean by lash marks?

Mr. Johnson—No, I don't know just what that phrase means. I have heard that phrase, and I want to know what it means.

Mr. Lane—I don't know exactly if it is felting. They run diagonally, as a rule, across the piece in places, just as if you took a whip and lashed them.

Mr. Johnson—Probably you may call lash marks what I call washer wrinkles.

Mr. Lane—It may be similar to a washer wrinkle, but I'd like to know, in your experience, whether that has been caused in the finish or in the dyeing.

Mr. Johnson—That is a very fair question. Providing the dyeing has been done on certain fabrics the regular way, and they have not been given any harsher treatment than usual, and if goods still continue coming with washer wrinkles, I think that is the finisher's job to send those goods into the dyehouse so that they will not wrinkle. Some goods need more setting to offset washer wrinkles, and other goods need less setting. That is my experience.

Mr. Lane—I have seen a number of pieces where they had this trouble come from the washer, and looked over before they had gone into the dye kettle, and they didn't show any signs of these lash marks until after they were dyed.

Mr. Johnson—Would you allow me to ask a question?

Mr. Lane—Certainly.

Mr. Johnson—Does that trouble happen on the same style all the time, or most of the time?

Mr. Lane—The biggest part of the time. Yes, I think that is true.

Mr. Johnson—I would say it is a finishing problem.

Mr. Lane—A question of setting?

Mr. Johnson—Yes, the goods are either not set enough, or set too much. That would be my personal opinion, without looking at the goods, from my own experience I want you men to appreciate that I only speak from my own experience, and being only in the one mill I am agent of now I have only had experience on the kinds of cloths that we have made there, which take in quite a wide variety, nearly all goods that it is possible to make in a worsted mill.

Mr. Butterworth—In time of trouble, is it the duty of the finishers and the dyers to get together and co-operate? Do you find that that is really the most important point in all troubles that occur in either department?

Mr. Johnson—I do, absolutely.

Mr. Butterworth—Lack of co-operation is really at the bottom of most troubles. I mean, where they don't get together troubles will occur and carry on, but where they do get together they usually eliminate them.

Mr. Johnson—I believe if the dyer and finisher get together in any plant, and are sincere when they do get together, if they will get busy and experiment—and I don't mean they should take a week getting started—make an experiment at once, then another, and another, in as many different ways as they can, I have seen nothing yet they couldn't eliminate.

Mr. Claflin—I would like to ask Mr. Johnson in regard to pieces crocking. Is it possible to eliminate crocking by subsequent finishing or scouring? How is it that a piece of goods can be scoured and show a perfectly clean wash water and still crock?

Mr. Johnson—May I ask you a question before I answer that. I'd like to know how you dye them, if it is mostly on Indigo dyeing?

Mr. Claflin—Sulphocyanine.

Mr. Johnson—You have got first to start with the dyehouse, and if the bath when the goods come out is clean and exhausted and dyed by the proper method, you should be able to have those goods go out so they don't crock, or crock so slightly that there would never be any complaints.

Mr. Claflin—The particular instance that I know of was where the same formula was used on some redyes. Some very bright goods had been dyed, and then the market didn't want those shades, so we turned them into Navy blues, and without any stripping, and those redyes crocked, when the original goods didn't crock at all. I have asked various people about the trouble. The general consensus of opinion was that if they stripped these goods with ammonia that they wouldn't have had the subsequent trouble of crocking. The trouble was too much acid in the goods, but that was just a roadside opinion, and I don't know whether any experimental work has been done to prove it, but I know the goods did crock on the redyes, and not on the original dyes.

Mr. Johnson—When you redyed them, did you redye them by sweet or sour method?

Mr. Claflin—I think it started ammonia acetate, and exhaust with acetic acid.

Mr. Johnson—When you start talking those terms I don't know anything about it. I don't know anything about dyeing. I have four brothers in the dyeing business, but I don't know those names at all. I can tell when a piece of goods is cloudy, and I know when to tell my dyer to get busy; if you can tell me whether it was sweet dyeing or sour dyeing, or indigo dyeing, that is the limit of my experience. I just want to make those points clear. I am not a chemist, and I am not a dyer. I don't profess to know anything about it.

Mr. Claflin—I suppose that would be in the general class of sour dyeing.

Mr. Johnson—Of course, sour dyeing has got to be wholly taken care of in the dyeing, as you cannot give sour dyed goods a soap scouring after dyeing. If the goods were Indigo dyed a good way to offset crocking is to scour your goods so that your lather is nice and white, rinse them well, dry them, and then rescour them again. You will find a wonderful improvement on crocking.

Mr. Putnam—May I ask Mr. Claflin if that was a sulphoncyanine? Don't you suppose that condition could have been that the dyestuff was indissoluble by the action of alkalies, and was no longer combined, and stripped itself?

Mr. Claflin—I have no idea. Those were just the conditions that were explained to me in the office of a mill.

Mr. Chairman—Any other questions?

Walter C. Durfee—I am a little curious to know if the crocking was in any way connected with the quality of soap that had been used in its past history. In the leather industry it is quite possible to get a nice clean exhaust, and have a very crocky piece of work. When you apply a little oil to the goods, and follow it up with a little dirty pigment, or anything like that, you get a beautiful clean water, and all the dirt is on the goods, and holds it there. There are also some classes of soaps which might possibly produce a similar effect. I'd like to ask if any of this crocking was in any way due to soaps that has been used on the goods previously.

Mr. Claflin—It seems to me no scouring that the color would stand would seem to cure the crocking, and that was the peculiarity: that you could scour the goods in as strong a soap as the color would stand, and after the wash the water was clean, yet the goods when dry would become crocky.

Mr. Johnson—I think you have to be very careful not to use a too strong soap after scouring. If your soap is made too strong, it starts stripping the color, and then there would possibly be trouble in crocking. Use as near a neutral soap as possible in scouring; that is the safest thing.

Mr. Putnam—Mr. Johnson brought up in his paper something interesting about a dryer shading a piece of worsted. I think that in some conditions, under local conditions, a dryer can shade certain piece dyes, but I think that that is chiefly in regard and as much related to the dyestuffs that is on that piece of cloth. There are some dyestuffs that are sensitive to the heat of the dryer, and some that are not, and there are cases, especially on gallocyanines, if you run the dryer too hot, I am sure you get bad results from the dryer.

Mr. Johnson—I put that question in as I wanted to get a little information myself, because in all the experience I have had I have never been able to tie down shaded goods to the dryer. I have had goods come off the dryer that looked shaded, but I have proved that the goods were not shaded; they were unevenly dryed, and I blame that mostly to uneven extracting. The trouble I get from uneven drying is in uneven width goods, and is caused by unevenly extracted goods and running your dryers at an uneven speed, having the pieces coming from the dryer thoroughly dried in places and not thoroughly dried in other places.

Mr. Putnam—I had a peculiar incident happen that brought that home to me clearer than anything I had ever had to prove that as a fact. It was during the war. We were using gallocyanine, and we had the big heat dryer break down; it so happened that two pieces of cloth were in the dryer. I happened to be closely connected with those pieces, and I knew their history. When they were taken out of the dryer, and put on the bench they were a pretty looking mess. There were places where the cloth was light, and there would be a whole section for yards that would be dark. I took measurements of the dryer, and knowing the exact condition of the piece, and where they were, I could place the front of the dryer and the top layer by the color of the piece. I proved conclusively to my mind that those pieces were actually shaded in the dryer.

Mr. Johnson—But that was where you had an accident,

where the pieces stood in there. I meant very broadly, in the natural run, where you get into the shaded pieces, whole sets, set after set shaded. I have found that same condition you speak of—that is an accident—like any accident. I wouldn't bring those in myself on the argument, for that was an accident pure and simple.

Mr. Leitch—I had some experience quite a while ago with blue worsted serges which were coming shaded sides and center. For an experiment we took some pieces from the dryer and laid them out on tables to cool, and found the pieces that were cooled spread out open were even, where we had been having shaded sides and centers where they were folded or rolled from the dryer. Since that time I have seen some evidence that uneven cooling is more responsible for the shaded sides and centers on some goods than the drying itself, and it was found that by using a cooling machine, or conditioning machine hitched direct on the back of the dryer, that we get much improved results. I am not interested in selling conditioning machines, but I think it's a pretty good argument for them.

Mr. Fisher—I'd just like to say to you gentlemen, in disappointing you in regard to Dr. Segre, that the sales manager of this concern in this country is a Southerner; Dr. Segre is over here from Italy, and I think they are trying to get him back as quick as they can, and it is just possible that they are down South. I want to apologize for disappointing you. And as for the artificial wool that I have seen, it looks to me like nothing more or less than waste from artificial silk with a little of the luster taken off. The greater part of the luster is taken off in the garnetting machines. There is some artificial wool that is made here that seems to be finding some uses in the trade at about 35 cents per pound. This stuff that Dr. Segre was going to talk about I think they would probably bring over here and try to sell at that price. The men that are in the woolen business have had a good deal more experience than I have in artificial wool. I don't know as there is anything that I can tell you that would be of interest; on account of its being in the nature of artificial silk, it takes a dye entirely different from wool, and gives it a mottled effect. Some of the samples which I have seen had as high as 75 per cent of this artificial silk scattered through it, and seemed to be very velvety feeling stuff, but I should think it would wear rather poorly. That was my impression, from looking at the cloth. The men that I have come in contact with in the trade say the samples have not taken hold very well. I am sorry that Dr. Segre didn't come up to tell you what his experience has been in Italy. He seemed to be quite enthusiastic about it.

Mr. Christison—If there is anyone interested in this artificial wool I could tell them something about it. Our concern has gone into it fairly thoroughly, and as Mr. Fisher has stated, the material apparently is nothing more or less than delustered Viscose. It is sold in various lengths. The Sniafil people have stated very emphatically that it is not waste, but is made especially for this purpose, cut into various lengths of staple, and made into top. It spins fairly well. There is a rather large loss in combing from noil, larger than we expected. In spinning it spins quite satisfactorily, but in the finishing and in the dyehouse it certainly requires special treatment. In the first place any concern that wishes to use it must be careful to keep it as clean as possible, because it cannot be given the scouring that we ordinarily give to worsted. It is quite weak when wet, and if your yarn is 100 per cent Sniafil, a very small tension will pull it to pieces in a washer, or in a dye kettle. It works better when it is combed with wool. It is fairly easy to dye, but you must be very careful in manipulating your goods to get your wool dark enough, as the affinity of the Sniafil for color is considerable. That is a disadvantage in one way, and it is an advantage in another—that is, direct cotton colors, that would bleed quite badly on ordinary cotton, on Sniafil stay so firmly with the fiber that they are relatively fast, and do not bleed to anywhere near the extent that you would expect them to bleed. There would be difficulty in drying the 100 per cent Sniafil cloth on tenter frames, but where it is carded or combed with worsted fiber it is fairly easy to handle. In weaving 100 per cent Sniafil requires a drier atmosphere than ordinarily used with worsted. If it is fairly damp, the way we run some of our weave sheds, the warp will stand very little tension, and will continually break. There is one feature about the Sniafil fabric that we wonder about, and that is this: What would happen if a person whose garments become wet in a shower should put a little tension on their clothes; would their elbows, or their knees, or something else push through? (Laughter.) The general appearance of the Sniafil is fairly like wool, although an experienced mill man could detect it quite readily by handling it.

THIRTY-EIGHTH COUNCIL MEETING

The thirty-eighth meeting of the Council of the American Association of Textile Chemists & Colorists was held at the Engineers' Club, Boston, Mass., on Friday, April 16, 1926.

The following members were in attendance: Prof. L. A. Olney, W. D. Livermore, E. H. Killheffer, W. C. Durfee, G. A. Moran, W. M. Moorhouse, W. K. Robbins, W. M. Scott, W. S. Williams, J. F. Bannan, and W. E. Hadley.

A. P. Howes attended the meeting as the guest of the Council.

Proceedings of the American Association of Textile Chemists and Colorists

The following applicants were admitted to membership.

Corporate

Quaker Oil Products Corporation, Conshohocken, Pa., Emil Niessen, president; Harry L. Miller, vice-president; Willard Parker, treasurer; Peter J. Schwab, secretary.

Harry L. Miller was designated to act as representative of this corporation at the meetings of the Association.

The Quaker Oil Products Corporation are manufacturers of textile oils of every description.

Active Members

Abrahams, S. B., textile chemist and chief chemist, McCarty Aniline & Extract Company, New York, N. Y. Address: 7013 Perry Terrace, Brooklyn, N. Y.

Asbury, Frank L., superintendent. Address: Hillside Cotton Mills, LaGrange, Ga.

Buettner, K. E., hosiery dyer, National Dyeing Company. Address: 2705 S. Ervay, Dallas, Texas.

Callahan, Cornelius, assistant chemist, Pacific Mills. Address: 141 Woodland Street, Lawrence, Mass.

Cassel, Norman S., chemical engineer, Procter & Gamble Company, Ivorydale, Ohio. Address: 524 W. 184th Street, New York, N. Y.

Clements, Earle A., Jr., superintendent, Globe Knitting Works. Address: 551 Plymouth Road, Grand Rapids, Mich.

Dort, Robert G., demonstrator salesman, American Cellulose & Chemical Company. Address: American Cellulose & Chemical Company, 15 E. Twenty-sixth Street, New York, N. Y.

Ehrengart, Chas. D., salesman, demonstrator, secretary, Onyx Oil & Chemical Company, Jersey City, N. J. Address: 34 East Henry Street, Linden, N. J.

Everett, Kenneth C., assistant textile chemist, Aspinook Company. Address: Box 81, Jewett City, Conn.

Frey, Fritz, dyer, Royal Piece Dye Works, Inc., Paterson, N. J. Address: 468 Van Dyke Avenue, Haledon, N. J.

Galloway, Leslie, textile chemist, American Aniline Products Corporation. Address: 1645 Andrews Avenue, Bronx, N. Y. C.

Gulick, Chas. P., treasurer and general sales manager. Address: National Oil Products Company, Essex and First Streets, Harrison, N. J.

Lange, Harry W., chief chemist, Oakes Manufacturing Company. Address: 190 State St., Flushing, N. Y.

Harrall, Edwin T., textile superintendent, H. E. Verran Company. Address: Stamford, Conn.

Jackson, Wycliffe C., bleacher, Lowell Bleachery South. Address 504, Griffin, Ga.

Kimble, F. M., dyer. Address: Cherokee Spinning Company, Knoxville, Tenn.

Luscian, Stephen J., chemist, dyer, Waltham Bleachery & Dye Works, Waltham, Mass. Address: Newton Y. M. C. A., Newton, Mass.

Murray, John Daniel, resident manager, Central Franklin Process Company. Address: Box 546, Chattanooga, Tenn.

Perry, Thos. C., superintendent, North Carolina Finishing Company. Address: Box 226, Salisbury, N. C.

Porter, William, superintendent of dyeing, Corticelli Silk Company, Mill No. 3. Address: 248 Crystal Avenue, New London, Conn.

Probst, Hans, chemist. Address: Royal Piece Dye Works, Box 1925, Paterson, N. J.

Robertson, Chas. H., superintendent. Address: Cattor Manufacturing Company, Hillsboro, N. C.

Roome, Lawrence C., colorist, Princess Print Plants, Inc. Address: 425 East Thirty-first Street, Paterson, N. J.

Sandridge, J. D., salesman and demonstrator, E. I. du Pont de Nemours & Co. Address: Box 1276, Charlotte, N. C.

Scheuer, J. B., bleacher and dyer. Address: Southern Bleachery, Greensboro, N. C.

Stanfield, O. B., dyer Peerless Woolen Mills. Address: 112 Maple Street, Rossville, Ga.

Junior Members

Carmel, Samuel L., research worker, Textile Department, H. Kohnstamm & Co., New York, N. Y. Address: 39 N. Fullerton Avenue, Montclair, N. J.

Hodges, George S., assistant superintendent. Address: Perkins Hosiery Mills, Columbus, Ga.

Holmes, Jasper A., foreman of dyehouse, Heminway Silk Company, Putnam, Conn. Address: Box 101, Putnam, Conn.

Meyers, Chester W., student, Lowell Textile School. Address: Arcadia Road, Billerica, Mass.

Moreau, Antonio, assistant dyer, Apponaug Finishing Company. Address: 8 McTeer Court, Natick, R. I.

Rice, Frank C., colorist, Zinsser & Co. Address: 85 Ash Street, Yonkers, N. Y.

Rizzini, William C., laboratory assistant, H. E. Verran Company, Stamford, Conn. Address: 389 Blackstone Street, Woonsocket, R. I.

Sauerbrey, Wm. A., assistant chemist, Nyanza Color & Chemical Company. Address: Westchester Country Club Grounds, Bronx, N. Y.

Wilhelm, Frederick L., H. E. Verran Company, Stamford, Conn. Address: 88 Berkshire Street, Providence, R. I.

Ferdinand J. Caya was transferred from Junior to Active Membership.

Considerable discussion took place in regard to the next Annual Meeting which is to be held in the South during

the early part of December of the current year. Dr. E. H. Killheffer was appointed Chairman of a Committee to arrange for the Southern trip.

Dr. R. E. Rose was designated to act as official representative of the Association while on a trip to Europe.

Regarding the list of dyestuffs which appear in the Year Book, it is the consensus of opinion of the Council that a great deal of attention be given to this matter in order that the records may be as correct as possible in every particular.

It was felt that those American dyes, the manufacture of which has been discontinued, should be dropped from the list. It was mentioned that there are undoubtedly a number of colors made in America at the present time for which there are neither Schultz or Colour Index numbers, but for which there was a pre-war nomenclature. It was suggested that a supplementary alphabetical list of these American colors could be compiled, mentioning the name used by the patentee of the pre-war product, and the name of the foreign colors which correspond to the American product. In this connection it could be mentioned whether the color has been discontinued or is obsolete. It was not considered advisable to publish any list of colors which are obsolete.

The Committee on the award of the $100 prize for the best paper published in the Proceedings during 1925, reported through their Chairman, W. H. Cady, and his report immediately follows:

Report of Committee on Prize for Best Paper During 1925

"The Committee appointed at the Annual Meeting in Boston last December to award the Association Prize of $100 for the best paper published in the Proceedings during 1925 desire to report as follows: All the papers were carefully examined individually by the members of the Committee, each of whom selected three papers representing his first, second and third choice for the prize. This was not an easy task, as several of the papers were of a high order of merit. It was found, however, that one paper, entitled 'The Application of Hydrogen Ion Determination to Textile Work," by Dr. Walter M. Scott, published in the AMERICAN DYESTUFF REPORTER, March 9, 1925, page 145, had been named by every member of the Committee either first or second choice, and by a unanimous vote the prize was awarded to Dr. Scott.

"WM. H. CADY, *Chairman.*"

Dr. Walter M. Scott, who was present at the meeting, expressed in a few words his appreciation of the decision which the committee had given to his paper.

It was voted that the awarding of the prize for the best paper published during 1926 take place at the Annual Meeting. The papers to be considered will be those that have been published between December, 1925, and November, 1926. Through the courtesy of the Howes Publishing Company, who have increased their subscription as Corporate Members, it will be possible to add second, third and fourth prizes of $75, $50, and $25 respectively. A vote of thanks was extended by the Council to the Howes Publishing Company in acknowledgment and appreciation of their increased subscription.

Respectfully submitted,

W. E. HADLEY, *Secretary.*

Applicants for Membership

Active Membership

Lewis, Maurice, chemical salesman, Doe-Ingalls, 198 Milk Street, Boston, Mass. Sponsors: W. H. Whitehall and J. F. Bannan.

Junior Membership

Edgar, Rachel, assistant professor chemistry, Iowa State College, Ames, Iowa. Sponsors: Wm. K. Robbins and H. D. Corkum.

Knight, J. L., chemist, Thomaston Bleachery, Thomaston, Ga. Sponsors: A. R. Thompson, Jr., and W. H. Willard.

Tarpey, Thos. Jos., student, Lowell Textile School, Lowell, Mass. Sponsors: L. A. Olney and Chas. L. Howarth.

Changes of Address

Arrow, H., 811 East Twelfth Street, Brooklyn, N. Y.

Benkert, Arthur L., 828 Bronx River Road, Fleetwood Hills, Yonkers, N. Y.

Brainerd, Arthur T., care of General Dyestuff Corp., 305 W. Randolph Street, Chicago, Ill.

Cowburn, Ralph, 445 Providence Street, Woonsocket, R. I.

Eichlin, A. S., 1464 Chapin Street, N. W., Washington, D. C.

Furman, Albert, 1332 Pike Street, Philadelphia, Pa.

Glendinning, Thos., 808 West Main Street, Knoxville, Tenn.

Hawthorne, Berkeley L., 52 Province Street, Laconia, N. H.

Kilduff, Frank B., 148 Theo. Parker Road, West Roxbury, Mass.

Logan, Geo. H., 3725 W. Chestnut Street, Louisville, Ky.

Smith, William C., Chadwicks, N. Y.

Stott, J. G., Jr., 227 West Huron Street, care of Ciba Company, Chicago, Ill.

Warner, John F., 8 Gage Street, Methuen, Mass.

Weber, Edward, National Aniline & Chemical Company, 357 West Erie Street, Chicago, Ill.

Obituary

Geo. F. Luck, Louden, Tenn.

Foreign Dyes Imported Through New York and Other Ports During April

Compiled by the Chemical Division of the Bureau of Foreign and Domestic Commerce in Collaboration with the Chemical Division of the United States Tariff Commission

KEY TO ABBREVIATIONS OF MANUFACTURERS' NAMES

1—THE SIX LEADING GERMAN COMPANIES

A—Actien-Gesellschaft fur Anilin-Fabrikation, Berlin. Founded 1873.
B—Badische Anilin-und-Soda-Fabrik, Ludwigshafen-on-the-Rhine. Founded 1865.
By—Farbenfabriken, vormals Friedr. Bayer & Co., Leverkusen-on-the-Rhine. Founded 1862.
C—Leopold Cassella & Co., Frankfort-on-the-Main. Founded 1870.
K—Kalle & Co., A. G., Biebrich-on-the-Rhine. Founded 1870.
M—Farbwerke, vormals Meister Lucius & Bruning, Hochst-on-the Main. Founded 1862.

2—THE SMALLER GERMAN COMPANIES

BK—Leipziger Anilintabrik Boyer & Kegel, Furstenberg. near Leipzig. Founded 1882.
CG—Chemikaliewerk Griesheim G. m. b. H., Griesheim-on-the-Main. Founded 1882.
CJ—Carl Jager G. m. b. H., Anilinfarbenfabrik, Dusseldorf. Founded 1823
GrE—Chemische Fabrik Griesheim-Electron, Offenbach-on-the-Main. Founded 1842.
L—Farbwerk Mulheim, vormals A. Leonhardt & Co., Mulheim-on-the-Main. Founded 1879
tM—Chemische Fabriken, vormals Weiler ter Meer, Uerdingen-on-the-Rhine. Founded 1877.
WD—Wulfing, Dahl & Co., A. G. Barmen. Founded 1842.

3—SWISS COMPANIES (ALL AT BASEL)

DH—Farbwerke vormals L. Durand, Huguenin & Co. Founded 1871.
G—Anilinfarben-und Extract-Fabriken, vormals Joh. Rud. Geigy. Founded 1764.
I—Gesellschaft fur chemische Industrie. Founded 1885.
S—Chemische Fabrik, vormals Sandoz & Co. Founded 1887

4—DUTCH AND FRENCH COMPANIES

FA—Farbwerk Ammersfoort, Ammersfoort, Netherlands. Founded 1888
NF—Niederlandische Farben-und Chemikalienfabrik Delft, Delft, Netherlands. Founded 1897.
CN—Compagnie Nationale de Matieres Colorantes et Produits Chimiques. Founded 1917. (Etablissements Kuhlmann merged with this company in 1923.)
P—Societe Anonyme des Matieres Colorantes et Produits Chimiques St. Denis (formerly A. Poirrier). Founded 1830.

5—ENGLISH COMPANIES

Bro—Brotherton & Co., Ltd., City Chambers, Leeds.
BAC—British Alizarine Co., Ltd., Manchester
BD—British Dyestuffs Corporation, Ltd., London.
Cl Co.—The Clayton Aniline Co., Ltd., Clayton, Manchester.
CV—The Colne Vale Dye & Chemical Co., Ltd., Milnsbridge, Huddersfield.
Hol—L. B. Holliday & Co., Ltd., Huddersfield.
Scot—Scottish Dyes, Ltd., Grangemouth.

IMPORTS of coal-tar dyes through New York and other ports during the month of April totaled 437,526 pounds, with invoice value $401,606. Imports by ports were as follows: New York, 387,546 pounds, with an invoice value of $332,854; *Albany, 47,735 pounds, with an invoice value of $66,000; Boston, 1,827 pounds, with an invoice value of $2,372; Providence, 400 pounds, with an invoice value of $380.

*Figures for Albany include January, February and March, 1926.

Imports of Synthetic Dyes

1926—	Pounds	Invoice Value
January	190,459	$184,018
February	479,027	477,255
March	487,804	435,891
April	437,526	401,606
Total, four months	1,594,816	$1,498,770

Five Leading Dyes, by Quantity, Imported During April, 1926

	Pounds
Ciba Violet R Paste	17,636
Indanthrene Blue GCD (single strength)	16,366
Ciba Red R Paste	15,872
Ciba Scarlets (single strength)	13,442
Vat Orange RRT Paste	9,603

Dyes and Intermediates Remaining in Bonded Customs Warehouse

	Coal-Tar Dyes and Colors (pounds)	Coal-Tar Intermediates (pounds)
July 31, 1925	775,916	1,378,837
August 31, 1925	767,431	1,363,760
September 30, 1925	709,381	1,359,717
October 31, 1925	609,750	1,055,241
November 30, 1925	521,238	746,226
December 31, 1925	633,525	758,618
January 31, 1926	703,159	763,409
February 28, 1926	596,154	855,170
March 31, 1926	447,588	896,530

Per Cent of Dyes by Country of Shipment

	1926			
	April	March	Feb.	Jan.
Germany	51.5	48	53	27
Switzerland	38	34	31	50
France	2	3	5	11
England	2	6	3	6
Belgium	3.5	4	4.5	3
Canada	1	2.5	0	1
Italy	2	2	3	1
Holland	—	0.5	0.5	1

Imports of Color Lakes

	Pounds	Invoice Vaalue
January	2,733	$2,393
February	143	....
March	58	....
April	843	....

The dyes in this report are grouped by both Colour Index and Schultz numbers, and in the case of those which could not be identified by either number the classification according to the ordinary method of application was adopted. As the pastes and powders of the vat dyes vary widely in strength and quantity, each vat dye has been reduced—in nearly every case—to a single-strength basis.

DYES OF COAL-TAR ORIGIN

Colour Index No.	Schultz No.	Name of Dye and Mfr.	Quantity (pounds)
32	182	Brilliant Sulphon Red B—(S)	1,000
54	64	Sorrel Red X—(IG)	1,000
69	73	Helio Fast Red RL Powder—(By)	100
104	—	Metachrome Olive Brown G—(Bro.)	2,000
128	119	Diamine Rose GD—(IG)	200
135	126	Blue JG (Janus Blue G)—(IG)	50
157	133	Eriochrome Phosphine RR—(G)	551
172	159	Acid Alizarine Black R—(IG)	2,400
173	—	Metachrome Violet B—(IG)	200
196	175	Acid Ponceau E—(G)	220
219	—	Eriochrome Flavine A Conc.—(G)	2,204
246	217	Alaska Black 10BX—(IG)	25
278	—	Benzo Fast Red 8BL—(IG)	
278	—	Chlorantine Fast Red 7BL—(I)	1,161
288	256	Sulphon Cyanine G—(By)	1,536
289	257	Sulphon Cyanine 5R—(IG)	100
306	264	Fast Sulphon Black F Conc.—(S)	500
307	256	Acid Milling Black B—(G)	2,204
316	273	Diaminogene Blue NA—(C)	
		Diazamine Blue GR Conc.—(S)	4,514
317	274	Diazo Fast Black MG—(By)	483
324	—	Diazo Brilliant Orange GR Extra—(By)	469
346	296	Cotton Yellow G Extra—(B)	100
364	303	Brilliant Yellow Conc.—(S)	100
382	319	Chloramine Red B—(S)	1,101
403	—	Diphenyl Fast Gray BC—(G)	662
409	339	Diamine Orange B—(IG)	5,000
430	—	Polar Red G Conc.—(G)	4,409
436	358	Chloramine Red 8BS—(By)	
		Chlorantine Red 8BN—(I)	848
441	—	Chrome Fast Yellow RD Powder—(IG)	110
451	366	Deltapurpurine 5B—(By)	500
459	373	Congo Orange R—(IG)	941
487	400	Acid Anthracene Red 3B—(By)	
		Acid Milling Red R Conc.—(G)	1,377
488	404	Diamine Yellow N Powder—(IG)	150
516	423	Blue NB—(IG)	1,000
518	424	Diamine Sky Blue FF—(IG)	200
532	—	Diazo Fast Green BL—(IG)	25
561	449	Trisulphon Brown B Conc.—(S)	3,001
577	457	Trisulphon Brown GG—(S)	2,000
596	476	Benzo Chrome Brown G—(By)	100
598	477	Diphenyl Brown GS—(G)	551
627	205	Diphenyl Chrysoine RRC—(G)	110
629	207	Diphenyl Fast Brown GF—(G)	551
636	19	Fast Light Yellow 3G—(By)	1,596
645	—	Kiton Fast Yellow 3G—(I)	331
652	29	Omega Chrome Red B Conc.—(S)	200
658	496	Setaglaucine—(G)	551
667	503	Brilliant Acid Green 6B—(By)	886
671	506	Erioglaucine AP—(G)	
		Erioglaucine EP—(G)	
		Erioglaucine X High Conc.—(G)	8,310
673	508	Xylene Blue AS Conc.—(S)	200
691	523	Fast Acid Green Extra Bluish—(Gr-E)	1,344
692	524	Acid Magenta—(C)	353
703	535	Alkali Blue 6B—(IG)	10
705	537	Methyl Silk Blue New—(G)	
		Reflex Blue K—(By)	210
710	541	Brilliant Sky Blue 5G—(By)	400
712	543	Brilliant Acid Blue V—(By)	339
714	545	Brilliant Acid Blue A—(By)	
		Poseidon Blue BR Extra—(B)	
		Poseidon Blue BXX—(B)	4,530
715	546	Cyanol Blue FF—(IG)	500
717	548	Acid Violet 6BNOO—(B)	500
720	551	Eriochrome Azurol BC—(G)	6,606
721	552	Chromal Blue GC—(G)	331
722	553	Eriochrome Cyanine RC—(G)	1,102
723	554	Crome Azurol S Conc.—(G)	551
729	559	Victoria Pure Blue BO—(IG)	1,527
733	562	Brilliant Wool Blue B Extra—(IG)	200
735	564	Alkali Fast Green 3G—(IG)	
		Erio Green B Supra—(G)	
		Xylene Fast Green B—(S)	2,302
749	573	Rhodamine B Extra (s. s.)—(B)	
		Rhodamine B Extra (s. s.)—(By)	6,235
751	574	Rhodamine 3B Extra (s. s.)—(IG)	25
786	—	Auracine G—(G)	220
788	603	Acridine Orange DHE—(DH)	
		Brilliant Acridine Orange A—(DH)	2,204
789	—	Patent Phosphine G, M, R—(I)	1,763
801	613	Quinoline Yellow Conc.—(S)	
		Quinoline Yellow Extra—(B)	560
813	198	Mimosa Z Conc.—(G)	551
815	618	Basic Yellow T—(IG)	
		Rhoduline Yellow 6G—(By)	1,100
833	—	Acid Blue AM—(By)	
		Wool Fast Blue BL—(By)	
		Wool Fast Blue GL—(By)	
		Wool Fast Viooiet B—(By)	
		Xylene Milling Blue GL, BL—(S)	4,828
842	680	Methylene Violet 3RA Extra—(IG)	250
851	690	Diphene Blue R—(A)	2,000
875	923	Fur Blue Black A, SA, SB—(IG)	
		Fur Brown NZD—(IG)	
		Fur Gray B—(M)	
		Fur Olive 6G—(IG)	
		Nako Black DB—(IG)	800

Colour Index No.	Schultz No.	Name of Dye and Mfr.	Quantity (pounds)
878	622	Brilliant Delphine Blue B—(S)	2,000
884	627	Chromacetine Blue S Extr—(DH)	441
892	635	Blue 1900 TCD—(DH)	220
894	637	Gallamine Blue Extra Paste—(G)	4,872
913	653	Danubia Blue BX—(IG)	500
926	661	Basic Blue GO—(M)	
		Thionine Blue G—(I)	1,382
927	663	New Methylene Blue N—(IG)	
		New Methylene Blue NS—(S)	1,500
971	748	Hydron Blue G Powder (s. s.)—(IG)	167
1006	746	Thional Green B—(BD)	300
1027	778	Alizarine VI Extra Pure—(IG)	
		Alizarine Red Paste—(G)	7,096
1034	780	Alizarine Red S Powder—(B)	441
1037	783	Alizarine Purpurine—(IG)	5
1040	784	Alizarine SX—(B)	
		Alizarine Red SX Extra Paste—(By)	2,295
1045	787	Alizarine Bordeaux BP Paste—(By)	399
1050	788	Alizarine Cyanine WRR Powder—(By)	100
1053	—	Alizarine Light Blue SE Conc.—(S)	2,000
1060	801	Anthracene Blue SWGG Ex. Powder—(IG)	100
1067	804	Alizarine Blue S Powder—(B)	
		Alizarine Blue S Powder—(By)	1,442
1075	856	Alizarine Astrol B Powder—(By)	3,452
1076	859	Alizarine Direct Blue RXO Powder—(B)	900
1078	865	Alizarine Cyanine Green G Powder—(By)	2,338
1082	863	Anthraquinone Blue Green BXO—(IG)	250
1084	854	Alizarine Viridine FF Paste—(IG)	3,997
1085	862	Alizarine Blue Black 3B Powder—(By)	1,314
1088	855	Alizarine Sky Black B Powder—(By)	6,868
1091	—	Alizarine Rubinol 3G—(By)	
		Alizarine Rubinol 5G—(By)	
		Alizarine Rubinol R—(By)	2,101
1095	759	Anthra Yellow GC Paste—(B)	2,214
1096	760	Vat Golden Orange G Powder (s. s.)—(B)	1,648
1097	761	Vat Orange RRT Paste—(IG)	
		Vat Orange RRT Paste Fine—(IG)	9,603
1099	763	Vat Dark Blue BOA Paste—(IG)	
		Vat Dark Blue BOA Paste Fine—(IG)	5,448
1102	765	Anthra Green B Powder (s. s.)—(IG)	800
1104	767	Vat Brilliant Violet RR Pst. Fine—(B)	
		Vat Brilliant Violet 2R Pdr.—(s. s.)—(B)	3,369
1109	840	Vat Blue 3G Paste—(IG)	
		Vat Blue 3G Powder—(B)	1,554
1113	842	Indan. Blue GCD Dbl. Pst. (s. s.)—(B)	
		Vat Blue GCD Dbl. Pst. (s. s.)—(B)	
		Cibaanone Blue GCD Dbl. Pst. (s. s.)—(I)	16,366
1118	849	Indanthrene Yellow G Paste—(B)	
		Vat Yellow G Dbl. Pst. Fine (s. s.)—(B)	6,226
1132	817	Vat Yellow GK Powder (s. s.)—(By)	1,848
1133	819	Algol Red R Extra Paste—(By)	
		Algol Red R Extra Powder (s. s.)—(IG)	3,998
1134	821	Vat Brilliant Violet BBK Pdr. (s. s.)—(By)	800
1135	820	Vat Brilliant Violet RK Paste—(IG)	
		Vat Brilliant Violet RK Pdr. (s. s.)—(By)	2,000
1143	827	Anthra Bordeaux R Paste Fine—(B)	990
1145	834	Vat Gray GK Paste—(IG)	666
1150	833	Vat Olive B Powder (s. s.)—(Gr-E)	
		Vat Olive R Paste—(By)	
		Vat Olive R Powder (s. s.)—(By)	4,997
1151	—	Vat Brown R Paste—(By)	1,596
1152	—	Vat Brown G Paste—(By)	5,276
1155	825	Algol Red B Powder (s. s.)—(IG)	
		Algol Red R Paste—(By)	599
1162	831	Vat Red RKP Powder—(IG)	200
1163	832	Vat Violet BN Paste—(B)	
		Vat Violet BN Ex. Pdr. (s. s.)—(B)	1,978
1170	795	Cibanone Yellow R Powder (s. s.)—(I)	2,648
1173	793	Cibanone Blue 3G Paste—(I)	1,102
1184	881	Brilliant Indigo 4B Paste—(B)	4,619
1188	884	Brilliant Indigo BB Paste—(B)	2,982
1190	885	Brilliant Indigo B Paste—(IG)	2,475
1196	890	Ciba Yellow G Paste—(I)	662
1200	895	Alizarine Indigo 3R Paste—(By)	399
1202	893	Alizarine Indigo G Paste—(By)	400
1208	919	Ciba Bordeaux B Paste—(I)	551
1211	910	Thioindigo Rose BN Extra Paste—(K)	1,426
1212	918	Ciba Red 3B Paste—(I)	
		Ciba Red 3B Powder (s. s.)—(I)	
		Thioindigo Red 3B Paste—(K)	
		Vat Red Violet RH Paste—(IG)	7,481
1217	913	Thioindigo Orange R Paste—(IG)	1,000
1222	901	Ciba Violet R Paste—(I)	17,636
1228	907	Anthra Scarlet 2G Paste—(IG)	
		Ciba Scarlet G Extra Paste—(I)	
		Helindone Fast Scarlet C Paste—(IG)	
		Thioindigo Scarlet 2G Paste—(IG)	
		Vat Scarlet 2G Powder (s. s.)—(K)	13,442
1229	908	Ciba Red R Paste—(I)	15,872

UNIDENTIFIED DYES

Acid Dyes

Name of Dye and Manufacturer	Quantity (pounds)
Acid Anthracene Red 5B1—(By)	100
Acid Blue RBF—(I)	551
Acid Pure Blue R Supra—(G)	551
Alizarine Leveling Blue CA—(C)	100
Alkali Fast Green 10G—(IG)	300
Azo Acid Black B—(IG)	500
Brilliant Acid Blue EG—(By)	200
Brilliant Acid Blue FF—(By)	662
Brilliant Scarlet N—(IG)	200
Brilliant Wool Blue FFR Extra—(By)	1,000
Cloth Fast Red B—(I)	110
Discharge Blue B—(IG)	100
Guinea Blue A—(A-G)	500
Guinea Fast Red 2R—(A-G)	500
Guinea Light Blue A2G—(IG)	100
Indocyanine B—(IG)	8,756
Indocyanine FF—(AG)	300
Ink Blue BITBNOO	1,700
Kiton Fast Green A—(I)	110
Lanasol Orange 2R—(I)	110
Milling Brown R—(IG)	100
Milling Orange G—(IG)	440
Milling Yellow F3G—(A-G)	200
Milling Yellow O3G—(A)	200
Neolan Blue B—(I)	441
Neolan Pink B—(I)	551
Neolan Pink G—(I)	551
Neolan Yellow G—(I)	110
Novazol Blue B—(G)	441
Novazol Violet B—(G)	220
Onis (Anthosine) B—(B)	100
Onis (Anthosine) 3B—(IG)	500
Onis (Anthosine) 5B—(IG)	400
Polar Orange R Conc.—(G)	882
Sulpho Rosazeine G Extra—(IG)	50
Sulphon Orange G—(By)	286
Sulphon Yellow 6G—(By)	300
Supramine Black BR—(IG)	800
Supramine Bordeaux B—(By)	100
Supramine Brown G—(By)	100

Name of Dye and Manufacturer	Quantity (pounds)
Supramine Red 3B—(By)	300
Supramine Red 2G—(IG)	800
Supramine Yellow R—(By)	200
Wool Blue R Extra—(By)	100
Xylene Milling Red B Conc.—(S)	500

Vat Dyes

Algol Blue 3RP Powder—(By)	441
Algol Brilliant Pink FB Paste—(IG)	400
Alizarine Indigo Gray B Paste—(By)	100
Ciba Pink BG Paste—(I)	
Ciba Pink BG Powder (s. s.)—(I)	3,314
Cibanone Blue RSNL—(I)	110
Cibanone Orange 6R Paste—(I)	220
Eridan Brilliant Scarlet B Paste—(IG)	500
Helindone Printing Black RD Paste—(IG)	4,000
Hydron Brown G Paste—(C)	
Vat Brown G Powder (s. s.)—(C)	3,436
Hydron Scarlet 3B Powder (s. s.)—(C)	3,432
Hydron Violet BBF Paste—(IG)	100
Hydron Violet BF Paste—(IG)	100
Hydron Violet RF Paste—(IG)	100
Indanthrene Brown 2G Paste—(B)	796
Indanthrene Brown RT Paste—(By)	397
Indanthrene Pink B Double Paste (s. s.)—(IG)	
Indanthrene Pink B Powder (s. s.)—(IG)	
Indanthrene Pink B Powder—(B)	4,284
Indanthrene Red 2G Paste—(B)	661
Indigosol Black TB Powder—(DH)	55
Vat Blue RSN Powder—(IG)	100
Vat Brilliant Blue R Powder (s. s.)—(IG)	800
Vat Brown 3R Paste—(B)	1,291
Vat Green 2G Double Paste (s. s.)—(B)	220
Vat Gray 3B Double Paste—(IG)	687
Vat Orange 4R Powder (s, s.)—(B)	1,890
Vat Printing Red B Paste—(IG)	100
Vat Printing Red G Paste—(IG)	100
Vat Red BK Powder—(IG)	10
Vat Red Brown R Paste—(IG)	472
Vat Yellow 3GF Double Paste Fine (s. s.)—(IG)	800

Mordant and Chrome Dyes

Acid Anthracene Brown PG—(IG)	2,038
Alizarine Astrol Violet B Powder—(By)	50
Alizarine Light Gray BS Conc.—(S)	2,000
Anthracene Chromate Brown EB—(IG)	500
Brilliant Chrome Blue S—(DH)	110
Chromazurine DN—(DH)	110
Chrome Brown G—(By)	220
Chrome Orange 2R—(DH)	55
Chrome Printing Red B—(DH)	441
Chrome Printing Red Y—(DH)	441
Chrome Pure Blue B Powder—(By)	215
Chromocitronine 3R—(DH)	110
Chromogene Black ET—(IG)	50
Chromogene Indigo B—(IG)	50
Chromogene Red B Conc.—(IG)	45
Chromogene Violet 3R—(IG)	50
Chromorhodine 6GN—(DH)	441
Chromoxane Brilliant Violet 5B—(By)	450
Chromaxane Pure Blue B—(By)	993
Chromaxane Pure Blue BLD—(IG)	100
Eriochromial Gray 5G Conc.—(G)	220
Eriochrome Blue S—(G)	551
Eriochrome Blue Black G—(G)	2,205
Eriochrome Violet B—(G)	2,983
Eriochrome Yellow G—(G)	507
Metachrome Blue Black 2BX—(IG)	3,000
Radio Chrome Blue B—(IG)	200

Direct Dyes

Benzo Bronze E—(By)	100
Benzo Fast Black L—(IG)	465
Benzo Fast Blue 4GL—(By)	633
Benzo Fast Blue 8GL—(IG)	500
Benzo Fast Brown 3GL—(IG)	450
Benzo Fast Copper Blue B—(IG)	100
Benzo Fast Gray BL—(By)	500
Benzo Fast Orange 2RL—(By)	500
Benzo Fast Violet BL—(By)	187
Benzo Fast Yellow RL—(By)	1,720
Benzo Rhoduline Red 3B—(IG)	500
Benzo Rubine SC—(By)	100
Benzoform Yellow GL—(IG)	100
Brilliant Benzo Green B—(By)	529
Brilliant Fast Blue 3BX—(IG)	800
Brilliant Pure Yellow 6G Extra—(By)	820
Brilliant Sky Blue 8G—(By)	441
Chicago Red 4B—(G)	1,102
Chloramine Fast Orange R Conc.—(S)	500
Chloramine Light Violet R Conc.—(S)	500
Chloramine Violet FFB—(By)	200
Chlorantine Fast Blue 2GL—(I)	2,204
Chlorantine Fast Bordeaux 2BL—(I)	1,102
Chlorantine Fast Brown 3RL—(I)	2,204
Chlorantine Fast Red 5BL—(I)	1,102
Chlorazol Fast Brown RK—(BD)	1,000
Columbia Red OB—(A-G)	100
Diamine Azo Fast Green G—(C)	1,488
Diamine Azo Fast Violet R—(C)	496
Diamine Brilliant Scarlet S—(IG)	1,000
Diamine Catechine B—(C)	110
Diamine Catechine G—(IG)	250
Diamine Fast Blue FFB—(IG)	100
Diamine Fast Brown G—(IG)	1,000
Diamine Fast Brown GB—(IG)	50
Diamine Fast Gray BN—(IG)	1,000
Diamine Fast Orange ER—(IG)	500
Diaminogen GG—(C)	2,105
Diazo Brilliant Blue 2BL Extra—(IG)	500
Diazo Brilliant Green 3G—(By)	558
Diazo Brilliant Scarlet 2BL Extra—(By)	1,323
Diazo Brilliant Scarlet 6B Extra—(By)	485
Diazo Fast Black Extra—(IG)	50
Diazo Fast Black SD—(IG)	500
Diazo Fast Blue 6GW—(I)	110
Diazo Fast Violet BL—(By)	600
Diazo Indigo Blue 4GL—(By)	1,000
Diazo Indigo Blue 2RL—(By)	116
Diazo Indigo Blue 3RL—(By)	220
Diazo Sky Blue B—(By)	2,082
Diazo Sky Blue 3G—(By)	2,459
Diazo Sky Blue 3GL—(By)	1,690
Diphenyl Brown BBNC—(G)	2,204
Diphenyl Fast Brown GNC—(G)	2,204
Diphenyl Fast Bronze B—(G)	3,306
Direct Fast Orange K—(G)	2,204
Fast Cotton Brown 4RL—(IG)	100
Fast Cotton Gray VL—(IG)	1,000
Fast Cotton Rubine B—(IG)	200
Fast Cotton Violet 4R—(IG)	100
Minaxo Light Brown G—(IG)	200
Minaxo Light Pink BX—(IG)	100
Para Black V—(IG)	100

Name of Dye and Manufacturer	Quantity (pounds)
Para Brilliant Orange G—(IG)	100
Para Brown GK—(IG)	100
Para Brown RK—(IG)	100
Para Brown V Extra—(IG)	100
Rosanthrene Orange R—(I)	1,984
Rosanthrene Pink—(I)	441
Trisulphon Bronze BG—(S)	200
Zambesi Black D—(IG)	500
Zambesi Black F—(A-G)	500

Dyes for Artificial Silk

Azonine Direct Blue B Paste—(IG)	500
Cellit Fast Blue R—(IG)	100
Duranol Red G Paste—(BD)	100
Setacyl Direct Blue G Powder—(G)	220
Setacyl Direct Blue R Powder—(G)	110
Setacyl Direct Yellow R Powder—(G)	110

Basic Dyes

Acridine Flavine R—(DH)	25
Brilliant Acridine Orange 3R—(DH)	220
Diazine Red B—(IG)	50
Excelsior Yellow 12G—(IG)	5
Methylene Blue 3G—(IG)	100
Rhodamine 6GDN Extra (s. s.)—(B)	
Rhodamine 6GDN Extra (s. s.)—(By)	8,500
Rhoduline Sky Blue 3G—(IG)	657
Tannastrol GO—(S)	1,000
Tannoflavine F—(S)	499

Sulphur Dyes

Immedial Brown W Conc.—(IG)	1,500
Thionol Yellow GR—(BD)	427

A LIST OF APPRAISEMENT OF COAL-TAR DYES WITHIN PARAGRAPHS 27 AND 28 OF THE TARIFF ACT OF 1922

The following supplemental list contains the month of entry, the name of the product within paragraphs 27 and 28, together with the designation as "C" (for competitive) and "NC" (for non-competitive), which indicates the appraisement basis for the assessment of the ad valorem duty in paragraphs 27 and 28 of the Tariff Act of 1922.

The ad valorem rate for competitive dyes is based on the American selling price, as defined in Subdivision (f) of Section 402 of Title IV; the ad valorem rate for non-competitive dyes is based on the United States value, as defined in Subdivision (d) of Section 402 of Title IV of the Tariff Act of 1922.

This list contains the appraisements received to date for the Port of New York, beginning with January, 1926. In the future these lists will be issued as a supplement to the regular monthly list of imports.

JANUARY

Alizarine Sky Blue B Powder	NC
Alizarine Sky Blue G	NC
Alizarine Light Blue SE Conc	C
Alizarine Supra Blue SES	NC
Azol Printing Brown 3RL Paste	NC
Benzarine	NC
Benzo Fast Copper Brown 3GL	NC
Brilliant Acridine Orange A	NC
Brilliant Delphine Blue B	NC
Ceres Red V	NC
Chloramine Blue 3G Conc	C
Chromacetine Blue S Extra	NC
Chloramine Light Violet R Conc	NC
Chromocitronine R	NC
Chromorhodine BR	NC
Ciba Scarlet G Extra Paste	NC
Ciba Violet R Paste	NC
Developed Fast Violet BL	NC
Diazol Light Red N8B	C
Gallazine No. 90 Powder	NC
Gallo Navy Blue S Powder	NC
Helindone Pink AN Powder	NC
Helindone Pink BN Powder	NC
Indigosol O	NC
Indigosol Yellow HGG	NC
Milling Red 4BA	NC
Metachrome Red G	NC
Selan Printing Brown 3R	NC
Supramine Green BL	NC
Thio Indigo Scarlet 2G Paste	NC
Triazol Light Orange 2RL	C
Vat Olive B Paste	NC
Vat Printing Brown R Powder	NC
Xylene Milling Blue BL Conc	NC
Xylene Milling Blue GL	NC
Xylene Milling Orange R Conc	NC

FEBRUARY

Acid Milling Yellow G Conc	NC
Acridine Orange DHE	NC
Alizarine Light Blue B Conc	C
Alizarine Light Blue SE Conc	C
Alizarine Light Gray BS Conc	C
Aniline Red (Sudan III)	C
Anthra Pink AN Paste for Printing	NC
Anthra Violet BB Paste for Printing	NC
Brilliant Sky Blue 8G Extra	NC
Chrome Printing Red B	NC
Ciba Scarlet G Extra Paste	NC
Columbia Catechine G	NC
Fast Sulphon Black F	C
Fur Brown NZD	NC
Fur Brown NZ	NC
Indigo MLB/6B Powder	C
Ink Blue BITBN Powder	NC
Methylene Green G Extra Conc	C
Milling Orange G	NC
Modern Violet Powder	NC
Quinolin Yellow Conc	C
Tannastrol GO	NC
Triazogene Orange R Powder	NC
Vat Gray 6B Paste for Printing	NC
Vat Khaki GG Paste for Printing	NC

MARCH

Acridine Orange DHE	NC
Alizarine Light Gray BS Conc	C
Alizarine Light Blue R Conc	NC
Brilliant Acridine Orange A	NC
Chloramine Blue 3G Conc	C
Chromazurine DN	NC
Chloramine Light Gray R Conc	NC
Ciba Scarlet G Extra Paste	NC
Indochromine RR Conc	NC
Methylene Green G Extra Conc	C
Ultra Corinth B	NC

APRIL

Ink Blue TITBNOC	NC

COAL-TAR IMPORTS ARE AGAIN LISTED AS COMPETITIVE AND NON-COMPETITIVE

The United States Tariff Commission has announced that it will resume its co-operation with the Department of Commerce in the publication of the monthly import lists of coal tar products, specifically in designing the listed items as competitive or non-competitive under the tariff act. This practice, which was carried on in connection with the coal-tar dye import lists for one year, was recently discontinued. The competitive and non-competitive designations will reappear on the statistics for the month of May.

During the period when this information was published, according to the announcement, only tentative data were available. The information beginning with May, 1926, will be final.

SUPREME COURT DECLINES REVIEW OF SANDOZ CASE

The case of the Sandoz Chemical Works, involving the valuation of an imported pyrazolon, was declined for review by the Supreme Court of the United States on May 24.

As will be recalled, the appeal of the Sandoz Chemical Works from the decision of the U. S. Customs Court of Appeals attacked the constitutionality of the American valuation clause in the section of the Tariff act covering the assessment of imported chemicals. By its action in refusing to review the appeal, the Supreme Court supports the legality of this section of the tariff which provides that the ad valorem duty of the imported product shall be based upon the American selling price of a comparable domestic product.

NEW CELANESE DYEING LEAFLETS

Four publications of interest to dyers have been issued by the American Cellulose & Chemical Manufacturing Company, Ltd., New York. These are: A card containing avoirdupois equivalents of metric weight per volume of measurements; two booklets on dyeing Celanese brand yarn; and a shade card showing mixtures in fast-to-light dyeings with SRA and vat colors.

The first booklet contains a list of direct cotton dyestuffs which leave Celanese white, giving the trade names and manufacturers of these colors and listing them according to fastness properties and shade. It should be of very practical aid as a reference tabulation for dyers who process fabrics made partly of Celanese.

The second booklet is a concise treatise on fast-to-light dyeings with SRA and vat colors in mixtures of Celanese yarn and cotton. It contains an authoritative description of the new method of cross-dyeing and dyeing solid fabrics (particularly drapery fabrics) containing Celanese and cotton or rayon in fast-to-light shades. This method allows the dyeing of such fabrics with Indanthrene colors on the cotton or rayon (leaving the Celanese unstained) and the filling in of the Celanese with the starred SRA colors. The starred SRA colors are a selection from the SRA range which are said to have excellent light fastness. The shade card accompanying this booklet exhibits twenty patterns and gives the dyeing proportions for each.

DAVID ASSUMES NEW ENGLAND SALES AGENCY FOR FADE-OMETER

S. R. David & Co., 252 Congress Street, Boston, advise that they have entered into an arrangement with Atlas Electric Devices Company, of Chicago, whereby they will act as sole selling agents in New England territory for the "Fade-Ometer"—the well-known fading cabinet for testing samples of dyed material for fastness to light.

On account of its speed of action, ease of operation and close approximation of the fading action of sunlight the Fade-Ometer has been adopted as standard equipment by a majority of the principal testing laboratories.

S. R. David & Co. report that they have used the Fade-Ometer in their own laboratory for a number of years with very satisfactory results. Their own testimony as to the operation of the apparatus under actual laboratory conditions should be of value in developing sales for it.

"The Role of Chemistry in Silk Manufacture" was discussed by Dr. Walter M. Scott, chief chemist for Cheney Brothers, the evening of May 21 at a joint meeting of the American section of the Societe de Chimie Industrielle, American Chemical Society, American Electro-Chemical Society and Society of Chemical Industry, in Rumford Hall, Chemists' Club, New York.

F. X. LEHMAN

Members of the dyestuff manufacturing industry were extremely grieved to learn of the recent death, after a brief illness, of F. X. Lehman, sales manager of Zinsser & Co., Hastings-on-Hudson. Mr. Lehman had numerous friends in the industry and his loss will be keenly felt. He was buried on Monday, May 17, in Boston. His funeral was attended by relatives and a number of business associates and acquaintances.

CLEMENT C. SPIEDEN

Clement C. Spieden, chairman of the board of directors of Innis, Spieden & Co., Inc., of New York, died on May 25 in Malvern, England. He had been on a business trip abroad and was stricken ill while in England.

Mr. Spieden, who was sixty years old, was president and director of the Isco Chemical Company, Inc., and vice-president and director of the Isco-Bantz Company, with offices at 46 Cliff Street, New York.

Born in Marshall, Va., and educated under tutors and at Marshall Academy, Mr. Spieden came to New York forty years ago and there entered the employ of a chemical house. He subsequently acquired an interest in the firm and later became executive head of Innis-Spieden & Co.

AMERICAN
DYESTUFF REPORTER

Devoted to the use and application of dyestuffs and the mechanical equipment incidental thereto.

LOUIS A. OLNEY
PROFESSOR OF CHEMISTRY AND DYEING, LOWELL TEXTILE SCHOOL
Directing Editor

CLAYTON HOAGLAND
Managing Editor

Published biweekly by
HOWES PUBLISHING CO., INC.
90 William Street, New York City

A. P. HOWES, *President* E. S. PREDMORE, *Secretary*

Subscription price $5.00 per year; Canadian $5.50; foreign $6.00

Vol. XV May 31, 1926 No. 9

INEFFICIENCY AND DYEING COSTS

ATTEMPTS to bring about economies in dyeing are frequently futile because the influence of waste and inefficiency in the purchase of dyeing materials and in the dyeing process itself is overlooked. An interesting reference to this factor was brought out in an address delivered before the Society of Dyers and Colourists by T. D. Buttercase, director of the Bradford Dyers' Association. The speaker declared that there is enormous waste in the dyeing industry because of lack of scientific system in selecting operatives best suited for particular jobs; that the possibility of effecting an appreciable saving in the use of colors and chemicals can be shown by an attempt to reconcile the totals represented by the dyers' statements with actual consumption according to purchases. He said he had known careful checking in this respect, in the case of chemicals, to effect a reduction of a discrepancy of 15 per cent to one of less than 5 per cent in a few months.

It may be conceded that since industrial efficiency has been "put over" in the United States on such a vast scale, it is probable dyeing operations here are more scientifically managed than in England. But who can deny that there is still room for improvement? Should American industry shy at the word efficiency because it has been overworked? It is quite true that the doctrine expounded by Ford and Hoover often becomes annoying by the persistency with which it forces its way into almost any discussion of production costs, overhead or scientific management. Yet the very fact that it does persist as a topic wherever business men talk shop is significant evidence that we have not yet had too much efficiency in industry.

Having advanced this excuse for the subject or our editorial, let us return to its application to the dyeing industry. A writer in a recent number of the Manchester Guardian, in an article on the high cost of dyeing, classifies dyers into two main groups: the dyer who controls his business on scientific lines and the dyer who carries on year after year in the same old way, working more or less according to rule-of-thumb methods. "In this classification," he says, "lies the secret of the high cost of dyeing." This authority dwells at length upon the great importance of chemical assistance in the purchase of colors; in the examination of samples to be matched, to determine the class of colors employed; in the study of processes with a view to discovering any unnecessary waste; in the periodical testing of bulk dyeings to see that they are up to standard fastness, and in the examination of new colors on the market, to discover their suitability for the particular trade of the dyehouse. He observes:

> You insure your dyehouse against fire and other risks—then look upon chemical assistance as an insurance against inefficiency and waste. By using the word inefficiency there is no disparagement intended or implied. It is impossible for any man to judge by appearance either the comparative value of two different samples of dyestuffs or the amount of unnecessary waste which is going down his drain. These very necessary factors to commercial success can be determined only by chemical means.

As an argument to dyers who say that they cannot afford a laboratory he presents the alternative of employing the services of a private chemist. Unquestionably the fees for such consultation would be insignificant in comparison to the time, labor and money saved by authoritative technical advice in the solution of problems, and above all in the elimination of wasteful methods which exist only because no one has thought very much about them.

But before we can assume a receptive attitude toward this subject we must regard it as entirely distinct from much of the impractical, theoretical, pish-tish on industrial efficiency which beclouds current ideas. The suggestions offered by Mr. Buttercase and by the writer in the Manchester Guardian are exceptionally practical and deserve the fair and unprejudiced consideration of every dyer who is sincere in his desire to stop waste and cut overhead. Certainly, if chemical assistance has been found profitable—nay, essential—in the operation of large mills and dyeing plants, would it not hold equal advantages for the smaller unit? If the big mill finds that it can materially reduce operating costs by the practical application of the doctrine of efficiency in buying its supplies and in controlling processes, does it not seem logical that the small plant has much to gain by following the example? Nothing can be accomplished, however, merely by agreeing verbally that considerable waste in dyeing can be stopped. The idea must be put into actual practice, the practice carefully checked, the results accurately tabulated in dollar-and-cents form and judged in relation to the initial outlay. And if the check-up proves con-

clusively that "gunning for waste" has achieved very positive and satisfactory gains, the industry in general should be told about it. A few more testimonials to back up the claims of those who have been preaching efficiency in dyeing operations might go far toward convincing the skeptics that efficiency is not all pish-tish.

NEW GREENVILLE EXHIBITION BUILDING

At a recent meeting of the directors of Textile Hall Corporation, which is now self-perpetuating under its new charter, the following directors were elected to serve for the ensuing year: John W. Arrington, W. W. Carter, J. F. Gallivan, B. E. Geer, Edwin Howard, John A. McPherson, J. E. Sirrine and William G. Sirrine, Greenville, S. C.; Cason J. Callaway, La Grange, Ga.; George H. Lanier, West Point, Ga.; I. W. Robert, Jr., Atlanta, Ga.; Donald Comer, Birmingham, Ala.; Fred O. Tyler, Anniston, Ala.; Robert I. Dalton, Rogers W. Davis, B. B. Gossett, J. Norman Pease, Charlotte, N. C.; S. F. Patterson, Roanoke Rapids, N. C.; Cartter Lupton, Chattanooga, Tenn.; H. A. Ligon, Spartanburg, S. C.

Plans for the Seventh Southern Textile Exposition are being rounded into shape. The applications for space have been so great that the steel building to be erected by the Truscon Steel Company has been twice enlarged. It will measure 60 by 200 feet, and will be alongside the main building, reached by three wide galleries fifteen feet long.

NEW DYEING PRICES OF THE CREFIELD ASSOCIATION OF SILK DYERS

The Association of Silk Dyers of Crefield, Germany, has made out new lists of prices for artificial silk and for the dyeing of stuffs and ribbons as well as for the dyeing of velvet materials. These lists have been in force since March 1.

The new prices include only the 10 instead of the 15 per cent protection discount. Account is taken in the new list of adjustments of the differentiations in prices of dyeing according to the standards previously announced as well as the new ruling for solid dyeings. The prices for the dyeing of the divers products in artificial silk which enter into the question are established separately. The temporary discount of 20 per cent previously announced is incorporated in the prices of the 90-denier size and above, while this arrangement applies also to the Bemberg and Holken silk. The increase of 20 per cent on artificial silk of Bemberg is included in the prices as well as the present increase of 50 per cent on acetate silk. The indication of the nature and the size is necessary in the future for all orders for dyeing. The previous decrease in the business turnover tax, as well as that after April 1 of this year is included in the established prices.

GERMAN RAYON PRODUCTION INCREASED

The production of rayon in Germany has doubled since 1923 according to a survey in Commerce Reports based on reports of Vice-Consul Bowerman and Assistant Trade Commissioner Nash, Berlin. Estimates of the output of rayon in Germany during 1925 range from 26,000,000 pounds to 33,000,000, compared with approximately 23,600,000 in 1924 and 13,000,000 in 1923.

Between 60 and 70 per cent of the total German production of rayon is credited to the Vereinigte Glanzstoff-Fabrikken of Elberfeld, which uses the viscose process. It has recently combined with Courtauld's, Ltd., of Great Britain for the erection of a new unit in Cologne with a daily capacity of 17,500 to 22,000 pounds. This plant will employ 4,000 workmen.

THE DYEING OF HATTER'S FELT

(*Continued from page* 354)

difficulties which will tend to impair the effectiveness of this method when it is performed on a large scale.

Dyeing with Chrome-Developed Coloring Matters

When the dyeing is carried out with the aid of chrome-developed coloring matters, as we have mentioned above, preliminary mordanting is employed for dyeing dark shades and after-mordanting for dyeing the moderately dark and the light shades. In the preliminary mordanting process from 2 to 4 per cent of potassium chromate is dissolved in the color vat, one-half of 1 per cent of sulphuric acid is added, and then the unfinished felt is added. The bath is raised to the boiling temperature and allowed to remain there for a period of one to one and one-half hours. The unfinished felt is allowed to remain overnight and in the morning it is washed. The dyeing itself is carried out in a fresh color bath in much the same manner as when acid dyestuffs are employed.

The after-mordanting treatment is carried out after dyeing, as in the case of the acid coloring process, when the color liquor has been cooled down to 40 deg. Cent., and then the necessary proportion of chromate of potassium, about ½ to 1½ per cent, in the well-dissolved condition is added. Then, after the felt has been added to the liquor it is brought up to the boiling point in a period of twenty to thirty minutes. It is then boiled for thirty to forty-five minutes. During this time, after about twenty minutes a test is made to make sure that the chromate of potassium has acted uniformly on both sides of the felt. If this is not the case, then additional chromate must be added after the fabrics have been turned and the cooking is continued. As a general rule, this is not found necessary and only badly dyed felts will give poor results on after-chroming. The faults that are found with this method of dyeing are the same as those which have been described under the acid coloring

matter process. In addition to those, there are also insufficient cooling before the addition of the potassium chromate and badly dissolved salt.

It now remains to discuss the process of dyeing hair felts in which the substantive diamine coloring matters are employed. The fundamental condition controlling the application of these coloring matters for this purpose is complete neutrality of the felt that is being dyed and of the dye liquor as well. The coloring matters of this group, as they are purchased on the market, are generally admixed with a certain amount of salt. The felt is wetted down as described above and the color bath prepared in the same manner. Then the temperature of the bath is raised to 40 deg. Cent. and the felt added and manipulated for a period of forty minutes. Then it is turned and the bath is slowly brought up to the boiling point. It is maintained at that temperature for forty-five minutes, and then the felt is turned once more and the fabric boiled for an additional forty-five minutes. Due to the slight fastness and the sensitivity of these coloring matters toward acid and hot-water fulling, they are employed almost entirely for the production of light shades on white, smooth felt used for making women's hats, which contains mostly unmordanted fibers which are subjected to finishing operations that do not have any bad effect on the coloring matter. But in this case as well it has been customary to supplant these coloring matters with the chrome-developed dyestuffs for the reasons that have been given above.

In conclusion, the author wants to indicate that when the felt is dyed in the unfinished condition it is possible to obtain a more complete and more uniform penetration of the coloring matter. However, it is also true that it is necessary to finish the material in this condition and that the dyeing treatment must not make it too difficult or impossible to give the felt the proper felting qualities by fulling, etc., so that the articles of wear that are finally manufactured from it possess all the requisite properties of such merchandise.

Dyeing in the Finished Condition

When the felt is dyed in the finished condition, there are only very slight difficulties encountered in securing regularity of coloring; but, on the other hand, there is very great difficulty in making the coloring penetrate the fiber completely. In dyeing velour fabrics it is essential that care be taken to see that the natural luster is retained. When the dye liquor is too strong or when the material is cooked therein for too long a time, it is a very difficult matter to retain the desirable luster of the fabric.

When acid coloring matters are employed, the process is best carried out in the following manner: The dyeing is performed on the well-wetted fabrics, the process being started at a temperature of 50 deg. Cent. The materials are worked for a period of twenty minutes, and then the dye liquor is brought up to the boiling temperature and maintained at that temperature until a sufficiently deep color is obtained in the fabrics. Then for the first time is acetic acid added to the proportion of 1½ to 2 per cent. The liquor is then boiled for another fifteen minutes, and then after the fabric has been turned from 1 to 1½ per cent of sulphuric acid is added and the boiling continued for another half an hour. It is often recommended that as the dyeing proceeds a little acetic acid be added from time to time. This practice, however, has never given good results when observed in actual large-scale dyeing operations, for it has been found very difficult, if not impossible, to obtain thorough impregnation of the fibers with the coloring matter when this process is employed. We would rather recommend the addition of ammonium acetate, for the acetic acid contained therein is gradually evolved from this salt and also after the deeper lying layers of the felt are properly impregnated with this salt. The action of other neutral salts, such as Glauber salt, is just as effective. They increase the surface tension of the color solutions, whereat they show a tendency to rise in the capillary passages which are found between the individual hairs in the felt, and in this manner the coloring matter is made to penetrate deeper into the structure of the fibers.

ADDITIONS TO THE GALLOPONT AND PONTAMINE SERIES

An important addition to the Gallopont colors, known as Gallopont Yellow T, offered exclusively for the printing trade, has been announced by E. I. du Pont de Nemours & Co. It is described as yielding very bright greenish yellows on both cotton and silk, and as possessing the same fastness properties and characteristics as the other types in this group.

A new color in the Pontamine series, Pontamine Diazo Orange 2R, has also been announced by this company. It is said to be well suited for all uses in which the previously offered Pontamine Diazo Orange is now used. The new type is somewhat redder and claimed to be considerably faster to washing, water and light. It is therefore of particular importance for dyeing piece goods for discharge work.

Recent promotions to the executive staff of the Kalbfleisch Corporation, made at the last meeting of the company's board of directors, are of general interest to the industry. P. M. Dinkins, formerly sales manager of the Heavy Chemical Division of Kalbfleisch, becomes vice-president. J. F. Fredriksson is likewise made a vice-president, and W. H. Niehardt assumes the duties of assistant treasurer.

Practical Hints on the Production of Bright Colors on Textile Fabrics

Part XIX

Two-Color Printing Machine—Operation—Proper Adjustment of Cloth—Advantages of the Machine

By RAFFAELE SANSONE

WITH the machine indicated in a preceding portion of this article it is only possible to produce lines, stripes or other effects of one color on the cotton fabric that has been bottomed with direct coloring matters. Should it however be necessary to conduct the topping with two colors for producing changeable effects, simple ombrée effects, and certain complex topping effects, a two-color printing machine constructed on the principle shown in Fig. 1 will give valuable results.

This shows a two-color printing machine recently designed for meeting the growing demand for machines of light structure. Here two parallel cast iron frame sides (F and G) are supplied at the bottom with foundation plates embedded in a cement flooring, and at the top with the round bar Z, with light union rods, and with a projecting frame C.

The frame sides have sliding slots, in which can be raised or lowered ball bearings supporting the short end shafts of a pressure bowl (M) of small diameter, simply by turning hand wheel W. This is connected with small conus pinion wheels, with flat pinion wheels and strong steel lifting screws.

Below the pressure bowl are placed two engraved copper rollers, so as to remain one on the front and the other on the back of the machine. Such engraved rollers are supplied, through circular brushes (e) or other convenient means, with the printing colors taken from very shallow copper-plated iron troughs, of which only one is visible in the figure, where it is indicated by t.

Pressure is applied on the printing cylinders, and their respective position regulated, by lower screws, of which only two are to be seen in the figure indicated by A and B. The turning of such cylinders against pressure bowl M is regulated by three pinion wheels (p), on the two upper of which is a special arrangement through which they can be turned loosely to adjust the position of the two different designs, and fixed at this point.

Two-color doctor shears and two lint doctor shears are fitted so as to rub against the upper portion of the printing rollers; the first being given a traverse motion of the usual variable throw cam type with rocking levels, or simply driven through the action of an eccentric, and the second being left rigid, without any other movement than that permitting the pressing against the printing rollers, or raising from the same.

The action of the color and lint doctor shears is controlled through small levers and weights, regulating the pressure exercised by these on the engraved cylinders. The levers and weights are carried in the inner portion of the machine, just against the cast-iron frame sides F and G, and do not interfere in any way with the work on the machine.

At the top of the plant is a guiding frame, supplied with the guide roller U and other special arrangements facilitating the entrance of the gray material from an ordinary wooden beam held in side bearings, as well as its removal after printing, which takes place in both cases from above.

An electric motor (E) is supplied with the machine for its driving, coupled by wheels y to a totally enclosed worm and spur reduction gear of high efficiency (Q), with hardened steel worm and ground teeth, and worm wheel with phosphor bronze rim, the shafts being fitted with ball bearings and thrust bearings. A heavy flywheel (m) eliminates vibration when the machine is running, and a magnetic brake is often supplied for preventing backlash when the motor is stopped. This method of driving has the advantage of being remarkably compact, perfectly noiseless and without vibration, and, the gearing being entirely enclosed, it affords the clearest working room and greatest safety to the printer.

Operation of Machine

Work on the above plant requires at first some experience before it can be conducted with full success. The following troubles are liable to occur:

1. Imperfect designs.
2. Irregular designs, or designs that go backward and forward at the borders of the cloth.

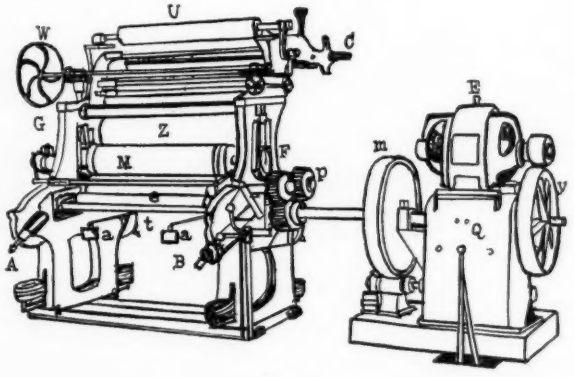


Fig. 1

3. Patterns the color intensity of which varies in different portioons of the same piece.

4. Dirty designs.

To avoid these, the operation must be as follows: After having thoroughly cleaned the machine to free it of all dust or grit, or to remove the remains of color pastes left from a batch of cloth just printed, the operators secure the engraved copper rollers that are to be employed for the treatment of the next batch of cloth, taking care that the position line on the engraved shell corresponds with a line present on the mandrel that has to receive it before they are entered in the machine and placed in contact with the driving pinion wheels p.

The next task is to determine the best driving speed to be adopted for the pattern to be produced. For the purpose, after receiving the color pastes, a portion is placed in the color troughs, while a small piece of waste cotton cloth is entered in the machine, which is moved to print a half yard at the highest speed at which the plant can be run, a half yard at medium speed and a half yard at the lowest speed. When this has been accomplished, a strip of the printed cloth is cut, leaving the rest of this in the machine.

The strip is dried rapidly and its different portions compared to ascertain at what speed it is best to run the machine to obtain the largest production and clearest effect or design. During the above tests the operators also ascertain if the two engravings are in the correct position to produce the desired design. Should this not be the case, they move the mandrel in one of the pinion wheels of the series p, through the special disposition on the same, to the right or to the left as is considered necessary to correct the position of the corresponding engraving; another half yard of the waste cloth is printed, after having fixed the mandrel in the pinion wheel, to determine if the desired effect has been obtained. Should the design not yet be printed correctly, the same operation is repeated.

After the above regulating operations, the printer's next work is to cut off the waste piece of cloth, leaving at the back of the machine enough for sewing on a sample of about a yard from one of the pieces of the batch of cloth to be printed. Three-quarters of this is then run through the machine, leaving in the remainder without treatment, cutting off a strip of the printed portion and drying rapidly to control the effect produced by the design and different color pastes used. If this is as it should be, the printer sews to the end of the sample of colored cloth the beginning of the first piece of the batch of the fabric to be printed, and starts the machine at the speed fixed previously.

The cloth, dyed in the direct coloring matters, is thus covered with a design of greater or smaller intensity in two colors, acquiring an appearance not possible of attainment by the ordinary topping processes, this supplementary covering being fixed in the drying and steaming operations that follow. As one piece is nearly finished, the operatives join on, in the most convenient manner, the beginning of a new piece to be treated immediately after, following this with the next pieces to be printed, until the whole batch of material has been passed through the machine. From time to time an operative adds color paste to the troughs on the printing machine, keeping the baths as much as possible at the same height and never allowing them to go much below this, excepting at the end of the treatment of the goods.

When the end of the last piece to be topped has been reached, this is allowed to run through the machine, and, if matters have been properly regulated by the color mixer, it should take up just what bath is necessary for its coloring, leaving very little color in the troughs under the engraved rollers and reducing the cost of treatment considerably, especially as it is not always possible to utilize old pastes. The accumulation of these is often a great nuisance to the color mixer, besides taking up space that could be better utilized.

Proper Adjustment of Cloth

To assure the correct placing of the cotton fabric on the wooden beam from which it is unwound on the above machine, this is often passed on a stenter followed by a weft straightener. An apparatus of this kind that already has found a considerable use for the purpose is constructed by Mather & Platt, Ltd., Manchester, England. This consists primarily of rollers which may be so disposed in relation to each other that they together form a cone or pyramid, the base of which can be transferred from one side of the machine to the other, as required, by simply turning a hand wheel. In passing over these rollers, the selvage of the cloth at the base of the cone has a longer path to travel than the selvage at the other side, or apex, of the cone. As the cloth as a whole must travel at the same speed, it follows that the ends of the advanced threads, having a longer path to travel, will be caught up by their opposite ends at the other selvage, which has a shorter path. By adjusting the angular relation of the rollers, the relative position of the ends of the weft threads may be so regulated that their displacement is corrected.

When once adjusted, the apparatus will continue to operate without further attention until a change in the relative positions of the weft threads makes a readjustment necessary. As the apparatus operates continuously, when once set occasional attention is required, with a consequent saving of labor and manual effort. Guide rollers are included to insure the fullest bind round the angularly adjusted rollers, and a slide roller is arranged to take up the slack of the cloth; the apparatus thus acts also as an ordinary compensator.

From the above description it will be seen that the weft straightener and compensator is remarkably sim-

ple in construction. It is driven by the cloth itself, has no gears or pinions to get out of order, and there is no danger of oil stains on the cloth. All the parts are visible; no expert attention is required; the apparatus is not attached to nor dependent upon any other machine, and occupies little more space than an ordinary compensator.

The Advantages of the Printing Machine

The two-color printing machine illustrated in Fig. 1 offers many marked advantages for the topping of cotton fabrics that have been bottomed in direct coloring matters. Through its means:

1. A topping can be produced with various two-color combinations.

2. A topping can be produced where a third topping color is produced through the crossing of designs in two colors which contrast very markedly with such colors and with the bottom or ground shade.

3. A special double-topping effect can be produced by superimposing a darker printed effect over a lighter or medium effect.

4. A topping can be produced with color pastes depositing a shining medium that contrasts very markedly with the direct color bottom.

5. A topping can be produced in which one of the basic color pastes deposits the shining effect and the other only prints on a color remaining dull, like the ground, that is slightly more shiny but not as bright as the other topping color.

6. A topping can be produced only in portions of the fabric in the form of various stripes and designs.

7. The production can be regulated to each pattern produced, being in all cases as large as possible.

8. As it is possible to print the fabric at a great speed, in some cases a reduction can be made in the amount of the thickening agent added in the preparation of the color pastes as a consequence of the greater mass of bath lifted against the color doctors, and consequently brought into the engraving, reaching the limits just possible in this instance to avoid running in the design.

9. A controlling clock at the back of the speed regulator enables the different speeds in yards per minute to be set beforehand, it being possible to reach any convenient speed.

10. The printer can suspend treatment, should a mistake be made in the preparation of a color paste, before even treating the beginning of the first piece to be topped.

11. A careful printer, through a few easy preliminary trials, can control the printed effects he will produce later on a whole batch of goods.

12. Should it be required to suspend immediately the printing of a pattern, or of a portion of a batch treated on a large scale, this can be accomplished by simply moving the handwheel (W) at the top of the printing machine.

(Part XX will appear in an early issue)

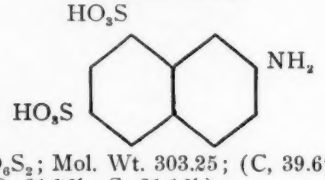
The Reduction Products of Azo Dyes

Part XIII

By WALTER C. HOLMES

Color Laboratory, Bureau of Chemistry

No. 147.—2-NAPHTHYLAMINE-6, 8-DISULFONIC ACID



$C_{10}H_9NO_6S_2$; Mol. Wt. 303.25; (C, 39.6%; H, 3.0%; N, 4.6%; O, 31.7%; S, 21.1%).

Derived from C. I. Nos. 197, 313, 314 and 315.

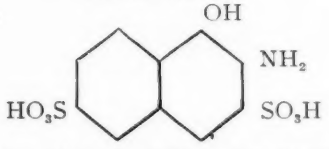
Small fine monoclinic needles ($+4H_2O$). Sol. in 9.82 parts H_2O at 20°. The salts are readily sol. (see Helv. Chim. Acta, *6*, 1146 (1923)). The acid fluoresces blue. It gives a yellow-red color with chlorinated pyridine.

With R-salt it gives a very sp. sol. red azo dye which is pptted. at once even at great dilutions. With an acetic acid sol. of diazotized nitraniline it gives a diazoamino comp.

It may be converted into 2-chlornaphthalene-6, 8-disulfonyl chloride, mpt. 170°, and into 1, 3, 7-trichlornaphthalene, mpt. 113°.

It gives 2-amino-8-naphthol-6-sulfonic acid on alk. fusion (200-230°).

No. 148.—2-AMINO-1-NAPHTHOL-3, 6-DISULFONIC ACID



$C_{10}H_9NO_7S_2$; Mol. Wt. 319.25; (C, 37.6%; H, 2.8%; N, 4.4%; O, 35.1%; S, 20.1%).

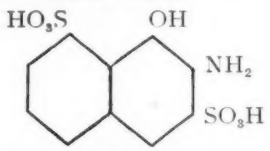
Derived from C. I. Nos. 54, 77, 85, 91, 181, 198, 250 and 388.

Sparingly sol. in H_2O. The ammon. sol. exposed to air on filter paper is green-yellow turning dull green and giving a pink spot with conc. HCl. No color with $FeCl_3$.

Acid Na salt, small silky needles, diffic. sol. in cold H_2O. It dissolves in alkalies with a weak yellow color, turning dark green in air. It is so sensitive to nitrite that it is oxidized at once but may be diazotized in the presence of $CuSO_4$.

The acid Na salt of the 2-diazo deriv. forms golden yellow cryst., readily sol. in H_2O. It couples at once with resorcin giving a blue-red dye turned blue by HCl.

No. 149.—2-AMINO-1-NAPHTHOL-3, 8-DISULFONIC ACID



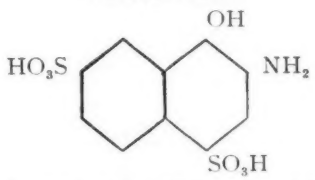
$C_{10}H_9NO_7S_2$; Mol. Wt. 319.25; (C, 37.6%; H, 2.8%; N, 4.4%; O, 35.1%; S, 20.1%).

Derived from C. I. Nos. 119, 126, 127, 130, 392, 473, 567 and 576.

Cryst. in long colorless needles (H_2O), only mod. sol. in cold. The ammon. sol. on filter paper becomes green-yellow and then gives a pink spot with HCl. No reactions with $FeCl_3$ or nitrous acid.

The 2-diazo deriv. may be obtained in the presence of $CuSO_4$ in the form of the deep orange yellow acid Na salt. It couples with resorcin in alk. sol. only on heating, giving a violet-black dye, turned yellow-red by HCl.

No. 150.—2-AMINO-1-NAPHTHOL-4, 7-DISULFONIC ACID



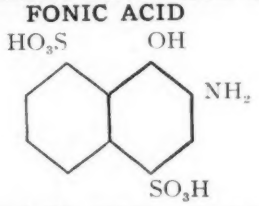
$C_{10}H_9NO_7S_2$; Mol. Wt. 319.25; (C, 37.6%; H, 2.8%; N, 4.4%; O, 35.1%; S, 20.1%).

Derived from C. I. Nos. 92 and 505.

White needles which dissolve in Na_2CO_3 sol. with a yellow color which gradually turns green. If this sol. is warmed a small amt. of a dye is formed which colors wool a dirty red.

The 2-diazo deriv. may be obtained in the presence of $CuSO_4$ in the form of its acid Na salt, yellow cryst., easily sol. in H_2O. It couples with resorcin at once giving a deep blue-red dye turned brown-red by HCl.

No. 151.—2-AMINO-1-NAPHTHOL-4, 8-DISULFONIC ACID



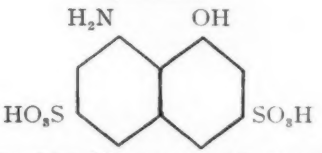
$C_{10}H_9NO_7S_2$; Mol. Wt. 319.25; (C, 37.6%; H, 2.8%; N, 4.4%; O, 35.1%; S, 20.1%).

Derived from C. I. Nos. 76, 86, 115, 251, 260 and 386.

Crystals, less sol. than No. 150. Dissolves in Na_2CO_3 sol. giving a brown sol. When this is warmed it turns red-brown and a dye is pptted. which dyes wool green-black.

The 2-diazo deriv. may be obtained in the presence of $CuSO_4$ in the form of its acid Na salt, glittering green-yellow cryst., readily sol. in H_2O. It couples with resorcin at once in alk. sol. giving a dark violet dye. With HCl the sol. turns red and then gives a glittering green pptte.

No. 152.—8-AMINO-1-NAPHTHOL-3, 6-DISULFONIC ACID
(H-Acid)



$C_{10}H_9NO_7S_2$; Mol. Wt. 319.25; (C, 37.6%; H, 2.8%; N, 4.4%; O, 35.1%; S, 20.1%).

Derived from C. I. Nos. 207 to 210, and 319.

Needles, .93% dissolves in H_2O at 18°. Gives a brown-red color with chlorinated pyridin.

Sols. of the neutral salts fluoresce violet and are colored brown-red by oxidizing agents.

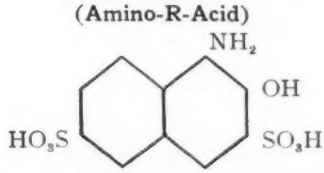
Acid Na salt ($+1\frac{1}{2}$ H_2O) fine needles, .167 gm. sol. in 100 c.c. H_2O at 20°, 2.4 gm. at 60°, insol. in alc. and ether.

Salt with *α-naphthylamine,* light violet-gray prisms (H_2O), mpt. 278° (decomp.); *ps. cumidine,* gray prisms (H_2O), mpt. 272° (decomp.); *p-nitrotoluidine,* gray prisms ($+1H_2O$), mpt. 265° (decomp.); tolidine, gray-violet prisms ($+3H_2O$), mpt. 260° (decomp.). (All of the foregoing salts are sol. in approx. 1,000 parts H_2O at room temp.)

On heating with dilute alk. H-acid gives chromotropic acid (colored grass green by $FeCl_3$ and orange-red by bleaching pdr. sol.).

The diazo deriv. forms yellow cryst.

No. 153.—1-AMINO-2-NAPTHOL-3, 6-DISULFONIC ACID
(Amino-R-Acid)



$C_{10}H_9NO_7S_2$; Mol. Wt. 319.25; (C, 37.6%; H, 2.8%; N, 4.4%; O, 35.1%; S, 20.1%).

Derived from C. I. Nos. 28, 55, 64, 79, 80, 88, 120, 127 (Thiorubine), 184, 200, 216, 253, 262, 264, 270, 282, 303, 305, 311 to 313, 315, 320, 354, 356, 357, 417, 504, 505, 507, 524, 529, 530, 546, 563, 574, 575 and 605.

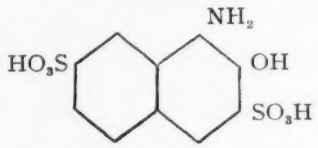
Readily sol. in H_2O. The ammon. sol. on filter paper turns green-yellow and gives a pale pink spot with HCl. Gives no reaction with $FeCl_3$ and no color with diazo comps. or nitrosodimethylaniline.

Acid Na salt, white silky needles, which are unstable in aqueous sol. $AgNO_3$ is reduced to metallic silver at once. On warming the sol. of the acid Na salt complete conversion into 1, 2-dioxynaphthalene-3, 6-disulfonic acid results quickly.

The 1-diazo comp. may be obtained in the presence of $CuSO_4$ in the form of its acid Na salt, yellow curds, readily sol. in H_2O. It couples with resorcin at once in alkaline sol. giving a deep blue dye, turned brown-red by HCl.

The 1-nitroso deriv. (disodium salt) forms golden yellow cryst. and gives a beautiful red dye with cobalt salts.

No. 154.—1-AMINO-2-NAPTHOL-3, 7-DISULFONIC ACID



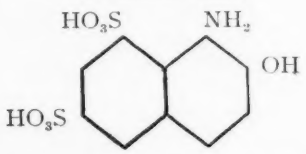
$C_{10}H_9NO_7S_2$; Mol. Wt. 319.25; (C, 37.6%; H, 2.8%; N, 4.4%; O, 35.1%; S, 20.1%).

Derived from C. I. Nos. 491 and 492.

The acid Na salt forms reddish cryst., diffic. sol. in cold H_2O. It dissolves in alkalies with a green-yellow color and the sols. oxidize in the air only very slowly.

The 1-diazo deriv. may be obtained in the presence of iron salts in the form of its brown-yellow barium salt. It couples with resorin in alk. sols. slowly in the cold giving a blue dye, turned brown-red by HCl.

No. 155.—1-AMINO-2-NAPHTHOL-6, 8-DISULFONIC ACID
(Amino-G-Acid)



$C_{10}H_9NO_7S_2$; Mol. Wt. 319.25; (C, 37.6%; H, 2.8%; N, 4.4%; O, 35.1%; S, 20.1%).

Derived from C. I. Nos. 27, 89, 131, 252, 313 and 382.

The acid is readily sol. in H_2O.

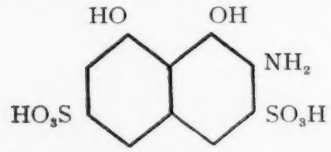
The acid Na salt cryst. in microsc. prisms. A dil. sol. reduces $AgNO_3$ only after several minutes (in distinction from amido-R-acid which gives immediate reduction).

On boiling the aqueous sol. of the acid Na salt a neutral salt of 1, 2-dihydroxynaphthalene-6, 8-disulfonic acid is obtained which is an excellent general precipitant for basic dyes.

The Ba salt of the 1-diazo deriv. may be obtained in the presence of $CuSO_4$ as yellow cryst., diffic. sol. in H_2O. It couples with resorcin only in the presence of caustic and upon heating, giving a dark violet dye which gives a fiery red sol. with HCl and then a red pptte.

Ammon. sols. of the amino acid on filter paper turn green-yellow and then red-brown and give an orange scarlet spot with HCl.

No. 156.—1, 8-DIHYDROXY-2-NAPHTHYLAMINE-3, 6-DISULFONIC ACID
(Amino-Chromotropic Acid)



$C_{10}H_9NO_8S_2$; Mol. Wt. 335.25; (C, 35.8%; H, 2.7%; N, 4.2%; O, 38.2%; S, 19.1%).

Derived from C. I. Nos. 29, 45, 53, 56, 90, 124, 125, 188, 342, 389, 390, 465, 466 and 508.

Colorless amorph. substance, readily sol. in H_2O. It dyes wool bistre-brown with subsequent chroming. An ammon. sol. on filter paper turns orange in air and gives a yellow spot with HCl which fades on drying. Excess $FeCl_3$ gives a brown-red color. The sol. in Ac NaO is scarcely oxidized by the air.

Acid Ba salt ($+2H_2O$), small yellow needles.

Ba salt ($+3H_2O$), yellow-red needles, diffic. sol. in H_2O.

Na salt, small red cryst. which turn brown-red on air drying. On oxidation with HNO_3 it gives 8-hydroxy-1, 2-naphthoquinone-3, 6-disulfonate, gold yellow prisms, readily sol. in H_2O but insol. in alc. or Ac HO, colored intense blue-red by trace of alk. and yellow again with excess alk. With o-toluylene diamine it gives toluoxynaphthazine disulfonate, sol. in H_2O with a yellow color turned gradually cherry-red by HCl, and sol. in conc. H_2SO_4 with a blue-violet color.

No. 157.—AMINO-1, 8-DIHYDROXYNAPHTHALENE-2, 4-DISULFONIC ACID

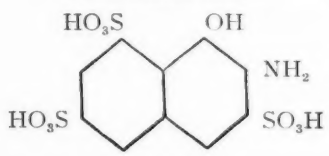
$C_{10}H_9NO_8S_2$; Mol. Wt. 335.25; (C, 35.8%; H, 2.7%; N, 2.4%; O, 38.2%; S, 19.1%).

Derived from C. I. No. 154.

The position of the amino group is uncertain.

Apparently no data are available on this compound.

No. 158.—2-AMINO-1-NAPHTHOL-3, 6, 8-TRISULFONIC ACID



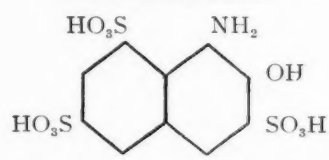
$C_{10}H_9NO_{10}S_3$; Mol. Wt. 399.31; (C, 20.1%; H, 2.3%; N, 3.5%; O, 40.1%; S, 24.1%).

Derived from C. I. Nos. 387, 464 and 501.

The acid Na salt forms microsc. cryst., faintly rose colored, mod. sol. in cold H_2O. It gives orange-yellow sols. with excess alkali which turn dark green slowly in the air.

The acid Na salt of the 2-diazo deriv. is obtained in the presence of $CuSO_4$ as a red-yellow, slightly cryst. pptte., readily sol. in H_2O. It forms a dark blue dye on warming with an alkaline sol. of resorcin, which is turned brown-red by HCl.

No. 159.—1-AMINO-2-NAPHTHOL-3, 6, 8-TRISULFONIC ACID



$C_{10}H_9NO_{10}S_3$; Mol. Wt. 399.31; (C, 20.1%; H, 2.3%; N, 3.5%; O, 40.1%; S, 24.1%).

Derived from C. I. Nos. 186 and 254.

The Na salt forms minute yellow cryst., readily sol. in cold H_2O. It disssolves in alkalies with a yellow color and a green fluorescence.

The corresponding salt of the 1-diazo deriv. is obtained in the presence of $CuSO_4$ as orange-yellow cryst. It couples with resorcin in alk. sol. on heating, giving a red-violet dye which turns fiery red with HCl.

Technical Notes from Foreign Sources

Discoloration in Textile Fibers

This was the subject of a paper which was presented before a meeting of the Society of Chemical Industry in England, as reported in The Chemical Age, 1926, page 303.

In this paper it was first pointed out that textile fabrics are inevitably manufactured under conditions which largely preclude the application of sterile methods. The raw materials employed in the process, the water used and the air in the mills are all contaminated with micro-organisms which are potentially injurious to fibers and fabrics. The micro-organisms that are important in this connection and that have been studied thus far may be divided into three groups. First, there are the bacteria; then the yeast, and finally the molds. In the case of wool, the bacteria concerned are mostly common soil types which occur naturally on the living fleece as spores. These spores if not dislodged germinate and cause discoloration, usually of a yellow or yellowish-brown character, and pronounced tendering. The spores are very resistant to germicides of various types.

In addition to these, three common pigment producing bacteria have been found to produce staining on wool; for example, bacillus prodigiosus, bacillus violaceus and bacillus pyocyaneus. Acidification of the wool tends to inhibit the growth of bacteria, but encourages the growth of yeast and molds. The molds produce discoloration and tendering, but are slower in action than bacteria. The discoloration varies from yellow to red, brown and violet. Yeasts produce discoloration only. In the case of starch-sized cotton goods, the frequently acid starch used provides a suitable food material for numbers of yeasts and molds, many of which are pigment producing and which give rise to widespread discoloration.

One species of pencillium was studied in some detail, mass culture on an inorganic salt nutrient and sucrose being employed. The pigment produced by the organism on the medium was of a deep orange-red color with green fluorescence. This was freely soluble in alcohol and readily yielded a lead salt. No crystalline product was obtained from this. A second pigment, orange in color and sparingly soluble in alcohol and ether, was also obtained. The mass cultures yielded a fat of a pale yellow color (melting point 13 deg. Cent.), the yield being 14 per cent of the dried residue. The fat had a saponification number averaging 194 in three batches.

Fast Colors on Textile Fibers

In the production of fast colors on textile products, the fiber is treated with a condensation product that is obtained by the action of amines on aldehydes in the presence of acids. Then the color is developed on the fiber, after diazotization, with the aid of amines or phenols. One example of condensation product is the one obtained from aniline, alpha naphthylamine or their homologues, with the aid of formaldehyde. The condensation product that is obtained from ortho-anisidine and formaldehyde, after diazotization on the fiber and developing with beta-naphthol, yields bluish red colors which are fast to washing and to bucking. It is also possible to carry out this process in such a fashion that the fiber is impregnated with the diazo compound, and then the latter is developed into color on the fiber itself. (French Patent No. 573,837.)

The Stretchability of Artificial Silk

Various important tests have been made in Europe on the behavior of viscose and acetate silk under varying conditions of moisture. When the effect of moisture is considered from the standpoint of the degree to which the silken materials can stretch, the results are very enlightening. It is then easily recognized that if the proper care is not taken in the winding and weaving process to see that the moisture in the air is maintained at some proper point, the artificial silken fibers will vary very considerably in their stretchability.

When artificial silk yarn is stretched, its diameter —that is, the diameter of the fiber—is naturally diminished. If yarn of different degrees of stretchability is employed in the weaving of fabric, then the latter will be found to possess many imperfections, such as thin and thick spots, and naturally when the fabric is dyed the color will be deep at one spot and light on another. The thin parts, which means those points at which the fiber have been stretched, appear differently colored than those where the yarn has not been stretched.

The method of determining the degree of stretchability of a viscose yarn, for example, is as follows: The yarn should have a stretch of 13.5 per cent at a 45 per cent humidity.

After the yarn has been subjected for four hours to air which has a relative humidity of 45 per cent at a temperature of 21 deg. Cent., it is put into a stretching machine which is provided with a time-registering device, and the fibers are subjected to weights added in at as regular steps as possible until a total of 44 pounds has been attained. The stretch at this point was found to be 3.9 per cent. The addition of more weights caused a change in the form of the curve, which showed that the endpoint had been reached, although the fiber broke for the first time when a weight of 56 pounds was employed. The stretch at

this point was 13.5 per cent. Samples of the same yarn stretched in the machine at a relative humidity of 85 per cent at a temperature of 21 deg. Cent. exhibited entirely different properties. The endpoint was reached with a weight of 10 pounds and the fabric broke under a weight of 35 pounds. The fiber had attained a stretch of 19 per cent at that point. Acetate silk will give similar results under the same conditions, although the moisture in the air has less effect on the degree of the stretch of the fibers, as in the case of the viscose silk. (Der Textilchemiker und Colorist, 1926, page 27.)

Bacterial Decay on Textile Fibers

In a series of investigations that have been made to determine the effect of bacteria on the textile fiber, a number of experiments were carried out to establish the deterioration of artificial silk through the action of micro-organisms. Thus, four samples of artificial silk were tested for their resistance to the action of cellulose-decomposing micro-organisms. They were submitted to three tests. In the first place, the samples were placed anaerobically in a nutrient solution which favored the development of cellulose-decomposing bacteria. In the second place, the samples were buried on frames vertically in a light garden soil reaching to a depth of 30 centimeters. In the third case, the samples were submerged on fixed frames in sea water.

Cellulose acetate silk was found to be the most resistant of the four samples that were tested. The varying degree of resistance among the other three types of artificial silk were in the following order: Nitro silk, viscose silk and cuprammonium silk. The reasons for the different rates of destruction are discussed. (Biochem. J., Vol. 19, pages 1088-1094.)

Fast Shades on Wool with Indigo

Wool is allowed to take up dehydroindigo-bisulphite compounds from an acid bath, after which the compounds are converted into the corresponding indigoid parent substances by known methods. For the development of the color, the wool, dyed with the bisulphite compounds, is treated with dilute sulphuric acid, or with ammonia or alkali carbonates at ordinary or higher temperatures. (German Patent No. 419,061.)

Laundering Textile Material After Bleaching

A solution of an acid and a chloride or other metallic salt, which has a reducing action due to the metallic constituent, is a good sour and antichlor after bleaching. Stannous and titanous chlorides are especially suitable for this purpose. Sodium silicofluoride or bisulphate or acetic, sulphuric or phosphoric acid may be used as acid constituent. (British Patent No. 243,877.)

Rendering Gelatine in Fabrics Insoluble

A solution containing 10 per cent of gelatine, 3 per cent of a 40 per cent formaldehyde and from 2 to 4 per cent of Turkey Red oil (ammonium sulphoricinoleate) remains liquid for one and one-half hours in the cold, but for a few minutes only at a temperature of 40 to 50 deg. Cent., the coagulated product being completely insoluble in boiling water. Fabrics are prepared with insoluble gelatine by successive treatments with a solution of gelatine and a solution containing Turkey Red oil and formaldehyde, and afterward drying; but more lustrous effects are obtained when the order of treatment is reversed. For further details see Bulletin Societe Industrielle Mulhouse, Vol. 91, pages 611-612.

The rate for "Position Wanted" advertisements in this column is 2 cents a word—with a minimum of 50 cents per insertion. For all other types of advertisements—i. e., help wanted, machinery or supplies for sale—the rate is $5.00 per column inch or less per insertion.

COLORIST

Colorist wanted by prominent New York dyestuff house to take charge eventually of Chicago laboratory. Must have good experience. Address Box 341, American Dyestuff Reporter.

SITUATION WANTED

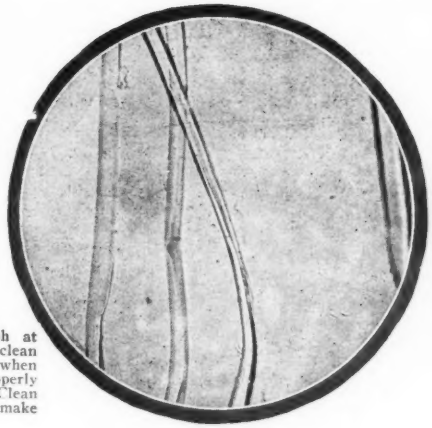
Experienced piece dyer on all silk, silk and cotton, silk and wool, cotton and rayon. Also experienced in jig dyeing. First class references. Post office box 279, City Hall Station, New York.

TEXTILE CHEMIST

Textile chemist desires responsible position. Has had fifteen years' experience in cotton yarn and cloth bleaching, dyeing and finishing plants. Wide knowledge of new artificial silk processing and fast color work, including vats and aniline black. Excellent references. Box 338, American Dyestuff Reporter.

DYER AVAILABLE

Practical dyer of union and all wool; thirty years' experience, also laboratory experience; desires position as overseer of dyeing. References gladly furnished. Address box 342, American Dyestuff Reporter.



The photomicrograph at the left, shows how clean the fibres come out when degummed in properly conditioned water. Clean fibres like these will make quality products.

The photomicrograph at the right, shows a faulty spot in silk that has been degummed in water containing a small amount of impurity. Note the deposits that cling to the fibres. These deposits caused by hidden impurities in the water, are the cause of rejections which have heretofore been difficult to trace.

Is Your Water Supply Working Against You?

WATER is your biggest raw material. It may seem to be perfectly clean and pure, yet it often contains dissolved substances that cause much trouble in manufacturing processes.

The best workmanship, the best raw materials, cannot do away with costly rejections of goods unless your water supply is free from impurities. But are you always certain it is?

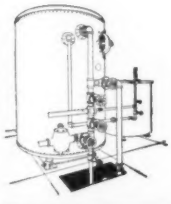
Just consider for a moment that just before it reaches your mill the water has come in contact with dead plants, leaves, soft rocks, limestone, and other impurities in the ground. It can't help picking up a lot of substances, some of which may be the very cause of various manufacturing troubles you are now having—difficulties that could perhaps be eliminated very easily after a careful study of your water supply.

Look at the two photomicrographs above. The right-hand one shows silk fibres that were degummed in untreated water. No one ever suspected there was anything wrong with the water, yet you can clearly see the deposits that were left on these fibres by the action of some substances that were dissolved in water.

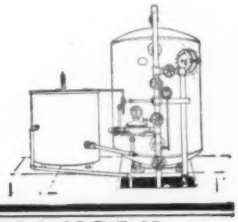
Now look at the left-hand picture. These fibres were degummed in Permutit-conditioned water. Note how clean and uniform they are. The mill owner who gave us these materials saved thousands of dollars by conditioning his water supply, though he had no idea there was anything wrong with it until our engineers investigated.

How about your mill? Are you absolutely sure of your water supply? Are you confident it never changes, never contains harmful impurities?

It will pay you to read a copy of our booklet, "Reducing Textile Costs and Troubles." It contains a wealth of valuable information about the influence of water impurities on all kinds of textile manufacturing. No obligations —Write for it today.



Permutit
water softeners
Take all the hardness out of water



The PERMUTIT COMPANY - 440 Fourth Avenue - NEW YORK

An Up-to-date

Tabulation of American Dyes

classified alphabetically and by Schultz and Colour Index Numbers is one of the features of the new

The 1925 Year Book

of the

American Association of Textile Chemists and Colorists

THIS tabulation forms a handy and reliable **Dyestuff Buyers' Guide.** It first appeared in the 1924 Year Book. For the new edition it has been revised, brought up to date and the Colour Index numbers included. If you know the name of any American color or merely its Schultz or Colour Index number you can quickly ascertain its classification, its maker and all competing products.

Fastness Tests

This Year Book also contains the Standard Methods of Determining the Fastness of Dyestuffs on Dyed Silk and Wool and Dyed and Printed Cotton. The tests are given for determining the fastness of dyes to laundry and mill washing, fulling, scouring and other agencies. The methods of making the fastness tests on each kind of fiber for each class of fastness are described fully.

The volume also includes the reports of the Sub-Committees on Fastness to Perspiration, Fastness to Light, Fastness to Carbonizing and Fastness to Sea Water and of the Research Committee of the Association. These reports contain technical material of value to anyone concerned with the testing and application of dyestuffs.

Copies of this volume may be obtained at $3 per copy from the Secretary of the Association, Walter E. Hadley, 5 Mountain Avenue, Maplewood, N. J., or from Howes Publishing Company, 90 William Street, New York City

Carbic Color & Chemical Company, Inc.

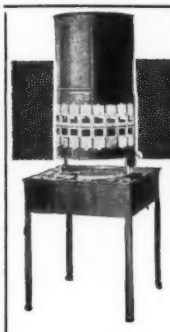
INDIGOSOL O INDIGOSOL O4B

Aniline Colors—Chemicals

451-453 WASHINGTON STREET NEW YORK CITY

Branch Offices: Philadelphia, Providence, Boston

SOLE AGENTS FOR DURAND & HUGUENIN S.A., PASLE, SWITZERLAND



Will it Fade? Ask the

FADE-OMETER

Standardized Sunlight

For the convenience of

NEW ENGLAND TEXTILE MILLS

the firm of

S. R. DAVID & Co.

252 CONGRESS STREET
BOSTON, MASS.

has been appointed

Fade-Ometer Representative for New England

Atlas Electric Devices Co.

364 W. Superior St. Chicago, Illinois

New York
F. Schlayer
25 Howard Street

London
Kelvin Bottomley & Baird, Ltd.
51/52 Fenchurch St., E. C. 3

Boston: S. R. David & Co., 252 Congress Street

1816 CHEMICALS *1926*

"Over a Century of Service and Progress"

BLEACHING POWDER

FINISHING MATERIALS

FORMIC ACID

COLORS

GUMS and WAXES

DYESTUFFS CAUSTIC SODA

INNIS, SPEIDEN & CO.

Manufacturers, Importers, Exporters of Industrial Chemicals

46 Cliff Street New York

BRANCHES:

Chicago Philadelphia Boston Cleveland
Gloversville, N. Y.

HOWES PUBLISHING CO.,
90 William Street, New York.

.....192...

Please enter my subscription for the American Dyestuff Reporter for one year from date, for which you may bill me $5.00.

.....

.....

Canadian Postage $5.50: Foreign $6.00.

.....

Index to Advertisers Appearing in This Issue

American Aniline Products, Inc.	III
American Rapidase Co.	VIII
Amid Duron Co.	IX
Arabol Manufacturing Co.	—
Arkansas Co.	XVI
Arnold, Hoffman & Co.	—
Atlas Electric Devices Co.	XV
Bosson & Lane	VIII
Campbell, John, & Co.	V
Carbic Color & Chemical Co.	XV
Ciba Co.	—
Corn Products Refining Co.	—
Cowles Detergent Co.	—
David, S. R., & Co.	—
Dorr Co.	—
Dunker & Perkins Co.	VIII
Du Pont de Nemours, E. I., & Co.	—
Dyer & Calico Printer	—
Fleischmann Co.	—
Foster, Edward C.	—
Franklin Process Co.	—
Geigy Co., Inc.	Front Cover
General Dyestuff Corp.	VII
Hunter, James, Machine Co.	—
Hussong Dyeing Machine Co.	—
Innis, Speiden & Co.	XV
International Salt Co.	—
Jennings & Co.	—
Kali Manufacturing Co.	VI
Klipstein, A., & Co.	Second Cover
Lewis, John D.	—
Malt-Diastase Co.	XI
National Aniline & Chemical Co.	XII
Neversink Dyeing Co.	IX
Newport Chemical Works	Back Cover
New York Color & Chemical Co.	V
Oakley Chemical Co.	VI
Onyx Oil & Chemical Co.	IX
Pennsylvania Dye & Bleach Works	IX
Permutit Co.	XIII
Roessler & Hasslacher	X
Rohm & Haas Co.	IV
Sandoz Chemical Works	—
Society of Dyers and Colourists	Third Cover
Solvay Process Co.	VI
Suter, Alfred	—
Textile Finishing Machinery Co.	—
Tolhurst Machine Works	—
Union Color & Chemical Co.	—
United Aniline Co.	XVI
United Chemical Products, Inc.	IV
U. S. Color & Chemical Co.	VIII
Vellner, Eugene	XI
Wolf, Jacques, & Co.	—

Dyes That Excel

Linked with

Service That Excels

A steadily increasing number of master dyers are finding it distinctly desirable to specify EXL DYES.

The first order verifies our claims for uniformity and dependability.

Repeat orders follow as a result of the genuine satisfaction with which EXL Dyes and EXL service give.

Let us demonstrate our capacity to give you similarly satisfactory service.

UNITED ANILINE COMPANY

DYESTUFFS, CHEMICALS, OILS AND SOAPS

120 HIGH STREET BOSTON, MASS.

"EXL DYES EXL"

ANTHRAPOLE OIL

UNEXCELLED FOR WOOL AND WORSTED PIECE DYEING

REMOVES OIL SPOTS AND LIME SOAPS

ELIMINATES THE CAUSE OF STREAKY PIECES, ASSURING LEVEL DYEINGS

ARKANSAS COMPANY

INCORPORATED

233 BROADWAY NEW YORK

COLOUR INDEX

in the English Language

Edited by

F. M. ROWE, D.Sc., F.I.C.

assisted by

C. LEA, M. Sc. Tech.

and

A Large Revision Committee of Experts

Size **12½"** x **9½"** **371** Folios (**742** Pages)

Bound in Full Leather **$32.00** Bound in Full Cloth **$28.00**

COLOUR USERS will find the "Alphabetical List" which sets out the various Makers of each Colour of the greatest use and assistance to them.

CONTENTS

SECTION A—Synthetic Organic Dyestuffs (291 folios).
SECTION B—Natural Organic Dyestuffs (10 folios).
SECTION C—Natural and Artificial Inorganic Colouring Matters (Mineral Pigments) (16 folios).
SECTION D—General Indices, Commercial Names, Patent Numbers, Intermediate Products, etc. (54 folios).

Commercial Names
Scientific Names
Components
Formula
Preparation
Discovery
Mode of Application
Literature
Description
Properties

of

Over 1300 Dyes

given, also a special column for purchaser's notes.

PUBLISHED AND ISSUED BY

The Society of Dyers and Colourists

PEARL ASSURANCE BUILDINGS, BRADFORD, YORKS., ENGLAND

For further particulars required apply THE SECRETARY

THE NEWPORT COLORS

New
Vat Color

Anthrene Red Violet R R N

Very level dyeing
very fast
excellent shading color

Newport Chemical Works, Inc.

Passaic, New Jersey

BRANCH OFFICES AND WAREHOUSES:
Boston, Mass.; Providence, R. I.; Philadelphia, Pa.; Chicago, Ill.; Greensboro, N. C.; Greenville, S. C.